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THE
CYCLOPÆDIA;
OR,
Universal Dictionary
OF
ARTS, SCIENCES, AND LITERATURE.

VOL. XXIII.

THE HISTORY OF

THE

ROYAL SOCIETY OF LONDON

THE
CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

BY THE MOST DISTINGUISHED ARTISTS.

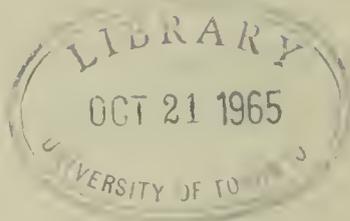
IN THIRTY-NINE VOLUMES.

VOL. XXIII.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME. & BROWN, PATERNOSTER-ROW,
F. C. AND J. RIVINGTON, A. STRAHAN, PAYNE AND FOSS, SCATCHERD AND LETTERMAN, J. CUTHELL,
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CYCLOPÆDIA:

OR, A NEW

UNIVERSAL DICTIONARY

OF

ARTS and SCIENCES.

MATTHEW.

MATTHEW, or *Gospel of St. Matthew*, a canonical book of the New Testament. The writer of this gospel, an apostle and evangelist, surnamed Levi, and son of Alphaeus, was, before his conversion to Christianity, a publican, or toll-gatherer under the Romans. He was a native of Galilee, but of what city in that country, or of what tribe of the people of Israel, we are not informed. Jesus found him at the receipt of custom, and called him to be witness of his words and works, thus conferring upon him the honourable office of an apostle. From this time he continued with Christ; and after his ascension, he was at Jerusalem, and partook of the gift of the Holy Ghost, with the other apostles. With them he bore testimony to the resurrection of Jesus; and, as we may reasonably suppose, preached for some time at Jerusalem, and in various parts of Judea, confirming his doctrine with miracles, which God enabled him to perform in the name of Jesus. Socrates, in the fifth century, says, that when the apostles went abroad to preach to the Gentiles, Thomas took Parthia for his lot, Matthew Ethiopia, and Bartholomew India; and it is now a common opinion, that Matthew died a martyr in Ethiopia, in a city called Naddabar, or Naddever; but the mode of his death is not ascertained. Others speak of his preaching and dying in Parthia or Persia; but we may infer from the diversity of these accounts, that none of them are well founded. Heraclion, a learned Valentinian, in the second century, whom Clement of Alexandria has cited, reckons Matthew among those apostles who did not die by martyrdom; nor does Clement contradict him. Chrysostom, though he mentions him with peculiar commendation, and speaks of his "coming from the presence of the council rejoicing," (see Acts, v. 41.) says nothing of his martyrdom. Hence we may infer, that there was not any tradition about it among Christians at that time, or that it was not much regarded.

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St. Matthew is said by many to have written his gospel in Judea, at the request of the Jewish believers, when they were likely to be dispersed by persecution; and it is thought by some, as Baronius, Grotius, Vossius, Jones, Wetstein, &c. that he began it in the year 41, eight years after Christ's ascension. But according to others, as Basnage, Dr. Lardner, &c. who follow the testimony of Irenæus, this gospel was written in the time of Nero, about thirty years after our Saviour's ascension, or about the year 63; 64, or 65 of the vulgar epoch. At the year 64, or about that period, the gospel had been propagated in many Gentile countries, the times were troublesome in Judea, and the war was coming on: several of the apostles were dead, others of them, who survived, were going abroad, and many of the Jewish believers were about to seek shelter elsewhere: now, says Dr. Lardner, was a proper time to write a history of Christ, and of his miracles. Moreover in this gospel are recorded divers plain predictions of the miseries and desolations of Jerusalem, and the overthrow of the temple and the Jewish state, besides many other figurative intimations of the same things in many of our Lord's discourses and parables; which could not be well published to all the world in writing till about this time. The suitableness of St. Matthew's gospel to the state of the Christian religion, and of the Jewish people, about the year 64 or 65, leads to that time. And however unwillingly, from private apprehensions and prejudices, we may admit the thought of protracting so long the writing of the history of our Lord's ministry; the circumstances of things, says Lardner, will constrain us to acquiesce in this season as the most likely. Cave thought that it was written about the 15th year after our Saviour's ascension, in the year 48. It was written, according to the testimony of most of the ancients, as Papias, A. D. 116, Irenæus in 178, Origen in 230, Eusebius in 315, Athanasius, Cyril of Jerusalem,

B

Jerusalem,

Jerusalem, Epiphanius, Gregory Nazianzen, Jerome, Chrysostom, &c. in the Hebrew or Syro-Chaldaic language, which was then common in Judea; but the Greek version of it, which now passes for the original, is said to be as old as the apostolical times. However, many learned moderns, as Fabricius, Erasmus, Lightfoot, Calvin, Le Clerc, Beaufobre, Whitby, &c. are of opinion, that this gospel was first written in Greek, which was much used at that time throughout the whole Roman empire, and particularly in Judea: and it is alleged that Papias, who first advanced the contrary opinion, was a weak and credulous man. Jones, Bafnage, Lardner, Jortin, &c. are of this opinion. Dr. Lardner observes on this point, that if St. Matthew did not write till about thirty years after our Lord's ascension, which he thinks most probable, he would use the Greek language; but if he wrote his gospel within the space of eight years after Christ's ascension, it is most likely that he wrote in the Hebrew. He adds, farther, that there was very early a Greek gospel of St. Matthew, cited or referred to by Clement of Rome, Ignatius, Polycarp, Justin Martyr, and others, none of whom intimate that they made use of a translation: that many of the ancients do not seem to have fully believed that Matthew wrote in Hebrew, because they have shewn very little regard to the Hebrew edition of it: that there are not in our Greek gospel of St. Matthew any marks of a translation: that there is no where any probable account who translated this gospel into Greek; and besides, as the Greek gospel was translated into Hebrew in very early days of Christianity, many not examining it particularly, nor indeed being able to do it, for want of understanding the language, might imagine, that it was first written in Hebrew. Hence, according to Dr. Lardner, sprung the opinion, that Matthew published his gospel at Jerusalem, or in Judea, for the Jewish believers, and at their request, before he went abroad to other people: whereas he apprehends, that this gospel, as well as the others, were written and intended for believers of all nations; and that the Nazarene gospel was St. Matthew's gospel, translated from Greek, with the addition of some other things, taken from the other gospels, and from tradition. Allowing the date of this gospel already assigned, he cannot conceive the reason why Matthew should write in Hebrew any more than any of the other evangelists; for it may be reckoned highly probable, or even certain, that he understood Greek, before he was called by Christ to be an apostle. Whilst a publican, he would have frequent occasions both to write and speak Greek, and could not discharge his office, without understanding that language.

According to the testimony of Irenæus, all the Jewish believers in general received the gospel of St. Matthew entire, with the genealogy at the beginning: for Irenæus says expressly that Matthew "strove by all means to give to the Jews full satisfaction, that Christ was of the seed of David: wherefore he began with his genealogy." The first chapter of this gospel is quoted by Justin Martyr (A. D. 140) in his First Apology; by Tertullian (A. D. 200), who says that Matthew, "for no other reason than that we might be informed of the origin of Christ according to the flesh, began in this manner:"—"The book of the generation of Jesus Christ, the son of David, the son of Abraham." Novatus (A. D. 251) several times quotes the first chapter of this gospel. The second chapter is referred to by Ignatius (A. D. 107), and by Hegesippus (A. D. 173), whence we are led to conclude, that this part of St. Matthew's gospel was owned by this Hebrew Christian. Epiphanius, however, informs us, that the gospel of the Ebionites begins thus: "It came to pass in the days of Herod, the king of Judea,

that John came baptizing with the baptism of repentance in the river Jordan," which is the beginning of the third chapter of St. Matthew, a little altered: and he says expressly, that this gospel called according to Matthew, is "defective and corrupted." It is nevertheless plain from a passage in Hegesippus, that he received the history in the second chapter of St. Matthew; so that, as Lardner suggests, he used our Greek gospel. Or, if he used only the Hebrew edition of St. Matthew's gospel, this history must have been in it in his time. The first and second chapters of this gospel are referred to in the Sibylline oracles, a work of the second century, according to Lardner: and the second chapter is alluded to by Victorinus (A. D. 290.) Cerinthus, an early heretic, who is supposed to have lived in or near the age of the apostles, made use of the beginning of St. Matthew's gospel, and from thence endeavoured to prove, that Jesus was descended in a natural way from Joseph and Mary. These chapters, however, are of doubtful authenticity, and have been rejected by several ancient and modern writers; and the candid reader must allow that they are liable to various objections. The external testimony against them is strong; and their contents present us with difficulties that are not easily solved. It has been alleged, that though the ancients, with one consent, affirm that the gospel by St. Matthew was originally published in Hebrew or Syro-Chaldaic, some of them represent the copies of it as not having the two first chapters; and this circumstance, it is said, affords a strong presumption against their authenticity. Whether this Syro-Chaldaic or Hebrew gospel be the original copy or not, such a copy certainly existed at a very early period; and its authority must be allowed to have considerable weight in deciding this question; especially when it is considered that we have no certain references or allusions to these chapters till the days of Celsus the Epicurean, about the year 150, or later, and of Irenæus, about 178. As to this Hebrew copy, the reception of it by the Ebionites, and perhaps also by the Nazarenes, yields a strong argument in favour of its authority. Epiphanius says, that the Nazarene gospel was *πληρῆστατον*, i. e. most entire, but that the Ebionite gospel was *οὐκ ἔσω πληρῆστατον*, i. e. not altogether entire. The former, it is thought by some, was the true original copy of St. Matthew; and the latter might be, in some degree, corrupted. Irenæus, Eusebius, and Epiphanius say, that the gospel received by the Nazarenes and Ebionites was the gospel of Matthew altered in some particulars, according to their different sentiments. Dr. Lardner adopts this opinion. Dr. Mills thinks, that the Nazarenes and Ebionites had the truest copy of St. Matthew's Hebrew gospel. That this Hebrew gospel was the original of St. Matthew, and that he wrote his gospel in Hebrew, is maintained by Papias, A. D. 116, the disciple and companion of Polycarp; Irenæus, A. D. 148; Tatian, A. D. 172; Hegesippus, A. D. 173; Origen, A. D. 230; Eusebius, A. D. 315; Pantænus, A. D. 192; Cyril of Jerusalem, Epiphanius, Gregory Nazianzen, Jerome, Augustin, Chrysostom, Isidore of Seville, Theophylact, and several other orthodox writers. Nor was this fact questioned, it has been said, till of late; for Erasmus was one of the first, who, in opposition to all antiquity, asserted that Matthew wrote in Greek; and he has been followed by many ingenious moderns; such are cardinal Cajetan, Oecolampadius, Flaccius Illyricus, Calvin, Vossius, and other foreigners, and Dr. Lightfoot, Dr. Whitby, Mr. Jer. Jones, Dr. Lardner, and other English divines.

Those who allow that there was a Syro-Chaldaic gospel of St. Matthew extant in very early times, and that the Nazarenes and Ebionites believed and declared it to be the original

original of St. Matthew, are nevertheless of opinion, that this gospel was originally written in Greek. To this purpose they allege, that the present Greek copy has no mark of a translation; that the Greek was the most proper language, because it was the most universal; and that St. Matthew, who was a publican before he became an apostle, must have been acquainted with it; that if our present copy of St. Matthew's gospel be only a translation, it must be of very doubtful and precarious authority, and that it must appear to be very strange and surprising that this Syro-Chaldaic gospel should be so soon lost, if it had been the work of an apostle. But to return from this digression to the question concerning the genuineness of the two first chapters: it has been urged that these chapters were not referred to for a considerable time after St. Matthew's gospel was publicly known. It is not certain that they are referred to by any of those who are usually called the apostolical fathers, though these fathers frequently refer to other parts of the gospel. Under this class we may comprehend Barnabas, A.D. 71; Clement of Rome, A.D. 96; Hermas, A.D. 100; Polycarp, A.D. 108. Irenæus, without doubt, acknowledged both the chapters as the genuine production of St. Matthew; so do also Clement of Alexandria, A.D. 194, and Tertullian, A.D. 200; and as we descend to later periods, allusions to them more frequently occur. The first and second chapters of St. Matthew's gospel are inserted in the Syriac version of the New Testament, and this may be considered as a strong argument in favour of their authenticity. The arguments from external testimony against their authenticity may be summed up in the following epitome: we have undoubted evidence that these two chapters were wanting in some very ancient copies of this gospel, which were used by the first Christians; the Ebionites certainly omitted these chapters, and we know that the genealogy was omitted by other Christians, nor have we any reason to think that they were inserted in the Hebrew or Syro-Chaldaic copy, which all the fathers jointly affirm to have been the original of St. Matthew: it is not probable that they would have been expunged, if they had been genuine, because there was but one point, *viz.* our Saviour's birth of a virgin, by which they seemed to oppose the notions of some particular sects of Christians, and that those sects might have overcome the difficulty in a much safer way, by either reasoning, as Cerinthus actually did, from the genealogy, that Jesus was the son of Joseph and Mary; or by receiving St. Mark's gospel, and rejecting St. Matthew's altogether. The collateral arguments against the authenticity of these chapters, deduced from their contents, are such as follow: it has been agreed by many writers, that St. Mark, in most places, agrees with the method and order of both St. Matthew and St. Luke, and so doth also St. John, after a short introduction concerning the Logos. St. Mark begins his gospel at what we call the third chapter of St. Matthew; that is, at the time when John came baptizing in the wilderness. As it is most probable that St. Luke was the first who published a gospel, and as he had given the genealogy, and a full account of the birth, &c. of Christ, there was no necessity for those who came after him to repeat the same things, as they were not particularly important to the virtue and happiness of man, the great end which our Saviour and his disciples had in view. Besides, St. Luke's account of the birth of Jesus, and of all the events which followed it, till Joseph and Mary carried him home to Nazareth, which he has fully detailed, is totally different from that which is found in the first and second chapters of St. Matthew's gospel. No coincidence occurs, except in Christ's being born at Bethlehem of a virgin, and in his dwelling at Nazareth. Hence it is inferred, that

the absolute silence of St. Luke, respecting many remarkable events supposed to be related by St. Matthew, yields a strong negative argument against the authenticity of these two chapters. There is also in the contents of these chapters something peculiar both in the sentiments and language, such as does not occur in other parts of the New Testament, chap. i. 20. ii. 12, 13, 19, 22. The appearance of a star in the east, directing the wise men to the new-born Messiah, in Judea, &c., it has been said, more the air of an eastern invention than of a real history. In chap. i. v. 3. a circumstance is mentioned that is scarcely credible, *viz.* that "when Herod the king had heard these things, he was troubled, and all Jerusalem with him." Another peculiarity in these chapters is the behaviour of the Magi to the child Jesus; "they fell down and worshipped him," chap. ii. 11. Moreover, Dr. Wall observes, that the account of the genealogy in St. Matthew is the most difficult to reconcile with St. Luke, or with itself, of any place in the gospel: he adds that there are more difficulties in these two chapters than in the whole Bible besides. There are also in these two first chapters several prophecies of the Old Testament, said to be fulfilled, but which cannot easily be made to correspond with the events by which they are declared to be accomplished. (See chap. i. 22, 23. chap. ii. 6. compared with Micah. v. 2.) The slaughter of the infants at Bethlehem, though a very remarkable fact, is not mentioned by any writer but by the supposed St. Matthew in this second chapter, and by those who quote from him. To this is annexed a prophecy, cited from Jerem. xxxi. 15, &c. supposed to relate to a totally different subject. The passage cited from Hosea, xi. 1. does not seem to have the most distant reference to the Messiah. (See ACCOMMODATION.) The flight from Bethlehem seems to have been impracticable; and from Nazareth it was altogether unnecessary, because the slaughter of the infants did not extend so far.

In order to account for the interpolation of these two chapters, without impugning the authenticity of the whole gospel, those who dispute their genuineness, and maintain that the difficulties which they furnish cannot be obviated by the records of history and the aid of criticism, recur to one or other of the following hypotheses. They take for granted that the gospel was originally written in the Syro-Chaldaic language; and that when it was translated into Greek, the body of Christians had little acquaintance with the language of the original, and therefore left the translator at liberty to add, or, if he had been so disposed, to take away what he pleased, without much danger of detection. If the translator was a believing Jew, it is possible that he might think a few prophecies, cited from the Old Testament, by way of accommodation, would have considerable influence upon some of his unbelieving brethren abroad, who, having never seen the original, would naturally think that the Greek copy was, in every respect, a faithful translation of that original. Or, this interpolation might have happened without the least design. These chapters might originally be a kind of introduction to the gospel of St. Matthew, drawn up by the translator of it into Greek, and never intended by him to be considered as a part of it. When the Greek copy of the gospel was spread abroad, those who were unacquainted with the original would naturally think, that, as it was called the gospel by St. Matthew, it contained nothing but the authentic writing of that apostle; and accordingly, it might be received as such in the countries out of Judea. When Origen, Jerome, &c. perceived that these chapters were wanting in the Ebionite gospel, there was nothing unnatural in their supposing, that they were left out with design, because the Ebionites, &c. were then considered

sidered as heretics, and, of consequence, capable of any fraud or imposture. The Greek copy of St. Matthew soon gained reputation, because it was used by the generality of Christians, whereas the Syro-Chaldaic copy was used by only a few poor Jewish converts in Palestine; and these, reputed enemies to the true faith. Hence the former copy would be deemed of much greater reputation than the latter. Upon the whole it should be observed, that no doctrine, or fact in Christianity, will be affected by the omission of the first and second chapters of St. Matthew; for as to the genealogy, birth, &c. of Christ, we have, in St. Luke's gospel, a full and consistent account of them; whereas these chapters contain scarcely any thing that is not difficult and liable to objections. We do not, however, think the difficulties incapable of solution, nor the objections altogether unanswerable. Professor Michaelis, in his "Introductory Lectures, &c." states, that if these chapters had been wanting in St. Matthew's original text, they ought not to be immediately rejected as an interpolation; for they may have been a separate writing of St. Matthew, designed by him to give an account of the childhood of Christ, to which he prefixed the title *Βιβλος γενεσιαις*, and to prevent its being lost as a separate composition, the translator, as it related to the same subject, might join it to the gospel of St. Matthew. The professor acknowledges the difficulties that occur in these two chapters, but he thinks it unwarrantable to reject them on that account. See Williams's Free Enquiry, &c. first published in 1771, and republished with additions in 1789. Michaelis's Introduction to the New Testament, by Marsh, vol. iii. part 1.

MATTHEW of Westminster, in *Biography*, an ancient English chronicler, and Benedictine monk of the abbey of Westminster, flourished in the fourteenth century: he compiled a chronicle in Latin, commencing from the creation, and proceeding down to the year 1307, which was entitled "Flores Historiarum," hence its author was named "Florilegus." This work related almost entirely to English history, and is freely transcribed from Matthew Paris and others. The writer is applauded for veracity and accuracy, but bishop Nicolson holds him up as a mere compiler, without any great degree of judgment. The "Flores Historiarum," &c. was published at London in 1567, and again at Frankfort in 1601. It is divided into three books, 1. From the creation to the birth of Christ; 2. From that period to the Norman Conquest; and 3. From thence to the beginning of Edward II.'s reign. A period of seventy years was added by other hands. Gen. Bing.

MATTHEW, *St.*, in *Geography*, an island in the Atlantic ocean, discovered in 1516 by the Portuguese, who have a settlement on the island. S. lat. $1^{\circ} 45'$. W. long. $13'$.—Also, an island in the Indian sea, near the coast of Siam. N. lat. $9^{\circ} 35'$. E. long. $97^{\circ} 52'$.—Also, a river of Lower Siam, which runs into the East Indian sea, N. lat. $10^{\circ} 5'$.

MATTHEW'S Bay, *St.*, a bay in the gulf of Mexico, W. of the gulf of Campeachy.—Also, a bay called *Mattheo* bay, on the coast of Peru, in the North Pacific ocean; six leagues to the N.E. by E. from Point Galera, and five or six leagues S.S.W. from the river St. Jago, with anchorage all the way.

MATTHEW'S, *St.*, *Day*, is a festival observed on the 21st of September.

MATTHEW'S Shoals, *St.*, in *Geography*, two rocky islets surrounded with shoals, in the East Indian sea. S. lat. $5^{\circ} 14'$. E. long. $124^{\circ} 54'$.

MATTHEWS, a county of Virginia, 18 miles long and six broad, bounded W. by Gloucester, N. by Middlesex,

E. by the Chesapeake, and S. by Mobjack bay; 193 miles from Washington.

MATTHIAS, *St.*, in *Scripture History*, an apostle, who was chosen in the room of Judas. He was qualified for the office to which he was appointed, by having been a constant attendant on our blessed Lord during the course of his ministry, and was probably one of the 70 disciples. He preached in Judea and part of Ethiopia, and suffered martyrdom. The traditions, and also the gospel of Matthias, are spurious. See GOSPEL.

MATTHIAS'S Day, *St.*, a festival of the Christian church, observed on the 24th of February.

MATTHIAS, in *Biography*, emperor of Germany, son of the emperor Maximilian II. was born in 1557. When he was twenty years of age, he was invited by the revolted states of the Low Countries to take upon himself the government of those provinces, which he accepted, appointing the prince of Orange to act as his lieutenant. His power was very circumscribed, and served only to give a sort of reputation to the revolvers as their nominal head; and in 1581, through the jealousy of the house of Austria, he was honourably dismissed. In 1594, he was appointed general of the army which his brother Rodolph II., emperor of Germany, sent against the Turks. In this service he was very successful, and so well ingratiated himself with the Hungarians, that they conferred upon him the most distinguished honours, and in 1607 elected him their king, on condition that he should confirm all their privileges, and allow the Protestants the free exercise of their religion. After this he was proclaimed king of Bohemia, in prejudice to his own brother Rodolph, and was crowned at Prague in the year 1611: he had, previously to this, obliged his brother to yield him the possession of the archduchy of Austria: and on the death of Rodolph, in 1612, Matthias was elected to succeed him. Such was the rapid elevation of this prince; but soon after he succeeded to the empire, a diet was convoked at Ratisbon, at which the Protestants agreed to present a memorial to the emperor, complaining of his privy-council for interfering in various matters relative to religion, over which they, by right, had no jurisdiction, and making several demands for the purpose of securing to them an equal administration of justice. An evasive answer was given, and the Protestants declined giving supplies of men and money to the empire till their grievances were redressed. The Catholics, on the other hand, recriminated on the Protestants, and, during their contests, the Turks made an irruption into Transylvania. After a variety of fortune, in which Bethlem Gabor took a distinguished part, peace was made in 1615, by which the grand seignor restored to the house of Austria all the places in Hungary that had been conquered by his arms, and re-instated the owners of all lands that had been alienated. Matthias now resolved to curb his Protestant subjects; and took measures accordingly. The Protestants were, however, enabled to procure a convocation of the states, and sent deputies to renew their remonstrances before the council. These, being roused by the ill treatment which they experienced, could not restrain their passions, and actually threw several of the members of the council out of the window; but fortunately no lives were lost on the occasion. The count de la Tour, who was the principal actor in this business, foreseeing its probable consequences, persuaded the Protestants to take up arms in their own defence. Matthias saw he had carried matters too far, and endeavoured to reclaim them by gentle means; but they returned bold remonstrances to his declarations, and accused his prime minister, Klesel, cardinal and archbishop of Vienna, of promoting the persecutions that they

they had sustained. The Protestants of Silesia were equally discontented, and made an alliance with the Bohemians, who were now in a state of actual rebellion. This was the commencement of that thirty years war which desolated Germany, and was productive of so many great and disastrous events. Matthias was obliged to banish his ministers, and the war between the Protestants and Catholics began with various success, but in the end Bohemia remained in the power of the Protestants. Matthias died in 1619, at the age of sixty three, after a reign of seven years as emperor. He left no legitimate issue, and recommended moderation to his successor Ferdinand. Univer. Hist.

MATTHIAS CORVINUS, king of Hungary, son of the celebrated Hunyadi, was a prisoner at his father's death, together with his elder brother Ladislaus, on account of the share which the latter had in the assassination of the count de Gilles, for which he was afterwards executed. Matthias was detained in custody at Vienna, whence he was removed by a counterfeit order to Bohemia. He was still held in confinement at Prague, but upon the death of Ladislaus the Posthumous, in 1458, he was elected king of Hungary, being then about the age of eighteen. From his very early youth he had manifested a martial spirit, and had excelled in warlike exercises. He could not obtain his liberation from the hands of the governor Podzebraski, till he had paid a large ransom and married his daughter. The emperor Frederic, having got possession of the ancient crown of Hungary, refused to deliver it up, and Matthias found himself obliged to go to war for its recovery, which at length he procured by a treaty. He then marched into Bosnia, and recovered Jayeza, the capital, from the Turks, which sultan Mohomet afterwards vainly attempted to reconquer. In 1468, he made a truce with the Turks, and being at peace in his own dominions, he was induced, as well from motives of ambition, as by the persuasions of the pope, to accept the crown of Bohemia offered him by the pontiff, on condition of extirpating the heresy of the Hussites in that country. Against this harmless people, and his father-in-law, the king of Bohemia elect, he carried on a sanguinary war, which was terminated by a treaty, securing to him the crown after the death of Podzebraski. Two years afterwards, that event took place, but the Bohemians elected Uladislav, son of the king of Poland. Matthias, enraged at this proceeding, marched an army into the country, in order to compel the people to acknowledge him for their sovereign; he was however shortly recalled by a rebellion in Hungary, led on by Casimir, second son of the king of Poland, to whom the crown had been offered. Matthias stopped his progress, and, in his turn, became the aggressor. War was continued till 1475, when, by a treaty, the king of Poland kept Lusatia, and the part of Silesia bordering on Bohemia, and Matthias retained the rest of Silesia and Moravia. While engaged in these contests, the Turks were making great progress in the frontiers of Christendom: Matthias, as soon as he had leisure, turned his arms against them, and having, in a measure, attained his object, he attacked the emperor Frederic III., with whom he had a quarrel in 1478. After ravaging Austria, and laying siege to Vienna, he consented to withdraw his troops, on being paid the expences of the war, and receiving the investiture of Bohemia from the emperor, who was to renounce his title of king of Hungary. The payment being refused, and the title still retained, Matthias invaded Lower Austria, of which, together with Vienna, he made himself the complete master in 1487. He died in that city in 1490, about the fiftieth year of his age, leaving no issue but a natural son. Matthias was reckoned one of the most splendid monarchs

of his age; a man of great enterprize, and of fine military talents, liberal and magnificent, an encourager of learning and the fine arts: he was himself acquainted with a variety of languages, and was lively and pleasant in conversation. He was, however, ambitious, and so violent in his temper, as sometimes to surpass, in his resentment, the boundaries of justice and humanity, though he was at no time destitute of the generosity and magnanimity that characterize a great prince. Univer. Hist.

MATTHIAS, *St.*, in *Geography*, an island in the East Indian sea, about 90 miles in circumference. St. lat. 1 50. E. long. 144 30.

MATTHIEU, PETER, in *Biography*, was born at Pontreux, in France, of a family in humble life. He studied among the Jesuits, became principal of the college of Verdun, and was afterwards an advocate at Lyons. He attached himself to the study of the belles lettres, but was particularly partial to history, to which he chiefly devoted himself when he took up his residence at Paris. He had an intention of writing the history of Alexander, prince of Parma, but was not permitted to stay long enough in the country to accomplish his design. He was introduced to Henry IV. by the president Jeanrin, and at the death of Du Haillon was made historiographer of France. He was assiduous in collecting memoirs of every kind, relative to the times in which he lived, as well as the earlier periods of French history. He was continued in his office by Lewis XIII., and accompanied that king in his wars against the Hugonots. He died at Toulouse in 1621. His works are not reckoned among those of the first rank, but they are esteemed exceedingly useful for elucidating the periods which he treats; among these are the following; "L'Histoire des Choses memorables arrivées sous le Regne de Henri le Grand;" "Histoire de la Mort déplorable de Henri le Grand;" "Histoire de St. Louis et Louis XI.;" "Histoire de France sous François I., Henri II., François II., Charles IX., Henri III. et IV., et Louis XIII." This last was a posthumous work, and published by his son, who continued the history of Lewis XIII. to 1621. He was author of some moral verses, entitled "Quatrains sur la Vie et la Mort;" and the tragedy "La Guisarde." Moreri.

MATTHIOLA, in *Botany*, is a genus of Plumier's, named by him after Peter Andrew Matthioli, the most popular commentator on Dioscorides; see the following article. Linn. Gen. 566. Schreb. 131. Willd. Sp. Pl. v. 1. 998. Mart. Mill. Dict. v. 3. Juss. 206. Plum. Gen. 16. t. 6.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceae*, Juss.

Gen. Ch. (according to Linnæus) *Cal.* Perianth cylindrical, entire, erect, short, permanent. *Cor.* of one petal, very long, its slender tube gradually terminating in an undivided limb, waved at the margin. *Stam.* Filaments five, awl-shaped, shorter than the corolla; anthers simple. *Pist.* Germen globose, inferior; style thread-shaped, the length of the corolla; stigma thickish, blunt. *Peric.* Drupa globose, of one cell, crowned with the calyx. *Sed.* Nut globose, with a globose kernel.

Ess. Ch. Corolla tubular, superior, undivided. Calyx entire. Drupa with a globose nut.

1. *M. scabra*. Rough Matthiola. Linn. Sp. Pl. 1661. (*M. folio aspero subrotundo, fructu nigricante*; Plum. Ic. 166. t. 173. f. 2. *Rategal, arbore indiano*; Zann. It. 167. t. 75. f. 1, 2? *Guettarda scabra*; Vent. Choix de Pl. 1. t. 1.)—Gathered by Plumier in the West Indies. Ventenat says, it is a native of the Caribbee islands.

This has always been a very obscure plant. Plumier represents

presents it as a *shrub*, with scattered, obovate, entire, very rough *leaves*, the *flowers* somewhat cymose, with pinnated *bractæas*. This last character however is erroneous, as well as the same author's figure and description of the *flower*, from whence Linnæus took his generic characters. Reichard and Swartz have long ago suspected the *Matthiola* to be a *Guettarda*, and Ventenat has at length reduced it to that genus, in the new work, left unfinished at his death, entitled *Choix de Plantes*. He saw the plant in flower in the gardens at Paris, and appears to have had no doubt of its being the same as Plumier's. See GUETTARDA; to the species of which this should now be added, by the name of

G. scabra. Leaves obovate, pointed, rough; rugged above; veiny beneath. Flowers with six stamens.—The stem is as thick as that of an apple-tree, with numerous, horizontal, widely spreading branches, whose subdivisions are opposite, round, rough, with short grey hairs, and leafy at the extremity. Leaves opposite (not scattered), on short thick stalks, accompanied by a pair of awl-shaped *sipulas*. They are three inches long and above an inch broad, rough like the foliage of a fig, obovate, or somewhat elliptical, slightly wavy; dark green above; downy and whitish beneath. Flower-stalks axillary, shorter than the leaves, divided at the top into two spreading dense spikes of white, silky, short-lived, highly scented flowers, much resembling a jasmine. The *bractæas* are lanceolate and crowded, so that Plumier's figure, though not very inaccurate, easily misled Linnæus. The limb of the *corolla* is divided into six oval horizontal segments, one-third the length of its tube. *Drupa* as big as a cherry, black and bitter, its nut of from four to six cells.—This seems to be what Lamarck has figured in his t. 154. f. 3. He, like Ventenat, has properly preferred the name *Guettarda*, to the more ancient one of *Matthiola*, because of the number of species already known under the former appellation, which it would be inconvenient to call *Matthiole*. So the old *Genipa* of Plumier is rightly sunk in the modern but better known *Gardenia*. The synonym of Zannoni, quoted by Linnæus with hesitation, ought surely to be excluded. See GUETTARDA and GARDENIA.

MATTHIOLUS, or MATTIOLI, PETER ANDREW, in *Biography*, an eminent physician, and medical botanist, was born at Sienna, in Tuscany, in the year 1501, where his father practised the same profession. His early education was received at Venice; and thence he was sent to the university of Padua, for the purpose of studying the law; for which, however, he conceived an antipathy, and turned his attention to medicine. His studies were prematurely interrupted by the death of his father; but his conduct had acquired for him the good opinion of the professors, who gave him the degree of doctor before his departure from the university. He returned to Sienna, where he speedily succeeded in finding ample employment. He appears, however, to have quitted his native place subsequently, and to have gone to Rome; whence he removed, in 1527, to the court of cardinal Bernardo Clesio, prince bishop of Trent, who held him in great estimation. He resided 14 years in the valley of Anania, in the district of Trent, where he acquired the respect and affection of the inhabitants to such a degree, that on his departure, men, women, and children accompanied him on his way, calling him their father and benefactor. He next settled as public physician at Gorizia, where a singular proof of the esteem in which he was held was likewise given; when a fire having consumed all his furniture, the people flocked to him the next day, with presents of goods and money, that made him richer than before, and the magistrates advanced him a

year's salary. After a residence of twelve years at Gorizia, he accepted an invitation from Ferdinand, king of the Romans, to take the office of physician to his son, the archduke Ferdinand. He was greatly honoured at the imperial court, and in 1562 was created aulic-counsellor to the emperor Ferdinand. Afterwards Maximilian II. prevailed upon his brother to part with him, and made him his first physician. Finding, however, the weight of age pressing upon him, Matthiolus took leave of the court, and retired to a life of repose at Trent, where he soon after died of the plague, in the year 1577.

He left several works, of which the following are the titles: "Dialogus de Morbi Gallici curatione," printed in the collection of Luifinus. "Apologia versus Amatium Lusitanum," Venice, 1558. "Epistolæ Medicinalium, Libri V." Prague, 1561. "Disputatio adversus viginti Problemata Melchioris Gulandi," Ven. 1563. "Opuscula de Simplicium Medicamentorum Facultatibus secundum genera et loca," ibid. 1569; which is a compendium of vegetable materia medica. His *Epistolæ* also relate chiefly to the virtues of plants, and their mode of exhibition.

The great work, however, by which this physician acquired his fame and honour, was his commentary on the writings of Dioscorides. His first Commentaries in illustration of this ancient botanist, were printed at Venice in 1548, in the Italian language, with the title of "Il Dioscoride, con li suoi discorsi, aggiuntovi il sesto libro de gli antidoti contra tutti i veneni." It was soon twice reprinted. He afterwards published it in the Latin language, and with the addition of small cuts, in 1554, with the title of "Commentarii in sex Libros P. Dioscoridis, adjectis quamplurimis plantarum et animalium imaginibus." Numerous editions, in Latin, enlarged and improved, were afterwards given; and the work was also many times reprinted in Italian, and in French and German translations by different persons. The best edition is that of Venice, 1565, folio, with large plates. Haller remarks, when speaking of the value of this work, that while the author was deeply versed in the study of the Arabians and their followers, he too much neglected the original sources, and the examination of plants. He was, therefore, frequently imposed upon by his correspondents, and sometimes even gave fictitious representations of plants, drawn merely from the descriptions of the ancients. He did not, however, altogether neglect the examination of plants; for he discovered several in Bohemia, and the district about Gorizia, the medicinal properties of which he made the subject of experiments on malefactors. He certainly contributed much to lay the foundation of botanical science; but, as Eloy remarks, the multitude of editions and versions of his work evinces the penury of the age in botanical books. An edition of all his works was published by Caspar Bauhin, with the addition of more than three hundred figures, at Basle, in 1598, folio, which was reprinted in 1674.

Matthiolus was twice married, and left several children: one of his sons was physician to the elector of Saxony. Gen. Biog. Eloy. Haller. Bibl. Botan.

MATTIA, in *Geography*, a river of Albania, which runs into the Adriatic, S. of Alessio.

MATTIACI, in *Ancient Geography*, a people who, according to Tacitus, resembled the Batavi in their habits and manners, and who had a common origin with them. They were alike valiant, but less firm in combat. They were taken under the protection of the Romans, and are supposed to have inhabited the country now called Zealand.

MATTIACUM, a town of Germany, placed by Ptolemy between Budoris and Artaunum; supposed to be Marburg in Hesse.

MATTIG, in *Geography*, a river of Bavaria, which runs into the Inn, near Braunau.

MATTIGAY, a town of Hindoostan, in Mysore, on the Cavery, opposite to Allumbaddy.

MATTIGKOFEN, a town of Bavaria; nine miles S. of Braunau.

MATTINATELLO, a town of Naples, in Capitanata; seven miles E. of Monte St. Angelo.

MATTINS, from the Italian, *mattina*, or the French, *matin*, morning, the first part in the daily service of the Romish church.

Mattins are sometimes held early in the morning, sometimes at midnight, and sometimes the evening before; and infirm people, even in monasteries, are dispensed from attending mattins.

MATTKEM, in *Ornithology*, a common name in Germany for the *Matkultzel*.

MATTO-GROSSO, in *Geography*. See MATO-GROSSO.

MATTS, on board a *Ship*, a kind of broad, thick clouts wove out of spun-yarn, or of a variety of strands, or separate parts of a small rope, or of a number of rope-yarns, twilled into foxes; and used to preserve the main and fore-yards from galling against the masts at the ties, and at the gunnel of the loof. They also serve to keep the clew of the sail from galling there; as also to save the clews of the fore-sail from doing so at the beak-head and bolt-sprit. The longest and strongest sort of these matts are called panches.

MATT-SEE, in *Geography*, a lake in the archbishopric of Salzburg; 12 miles in circumference.—Also, a town of the same archbishopric; a see of the bishop of Passau; 12 miles N. of Salzburg.

MATTUSCHKÆA, in *Botany*, named by Schreber, in commemoration of count Mattuschka, a German botanist, who was born in the year 1734, and died in 1779. The following works rank him in the list of authors on botany. In 1776, and the following year, Mattuschka published his *Flora Silesiaca*, in 2 vols. 8vo.; and in 1779 appeared his *Enumeratio stirpium in Silesia sponte crescentium*, in 1 vol. 8vo., a sort of compendium of the other work.—Schreb. 788. Willd. Sp. Pl. v. 1. 606. Vahl. Symb. p. 3. 11. Mart. Mill. Dict. v. 3. (Perama; Aubl. Guian. 54. Juss. 109. Lamarck Illustr. t. 68.)—Class and order, *Triandria Monogynia*. Nat. Ord. *Vitices*, Juss.

Gen. Ch. *Cal.* Perianth inferior, cloven into four, ovate, acute, villose segments. *Cor.* of one petal; tube long; limb cloven into four roundish lobes. *Stam.* Filaments four, nearly equal, the length of the clefts of the limb; anthers roundish, two-celled. *Pist.* Germen superior, four-cleft, furrowed on each side; style thread-shaped; stigma simple, (Aubl.) *Peric.* none. *Seeds* two or four, very small, naked (Juss.)

Ess. Ch. Calyx in four deep segments. Corolla funnel-shaped, equally four-cleft. Seeds naked.

1. *M. hirsuta*. Willd. n. 1. (Perama hirsuta; Aubl. Guian. t. 18.)—A native of moist and sandy places at Aroura and Orapu, in Guiana, where it flowers in June or July. According to Aublet, the whole plant is completely covered with reddish or rusty hairs. *Stem* slender, branched, villose, from one to two feet high. *Leaves* opposite, sessile, ovate, villose, longitudinally ribbed. *Flowers* apitrate, terminal, yellow. *Receptacle* chaffy, with fringed scales between each flower.—Vahl's description of this plant differs somewhat from the former, for which reason we sub-

join professor Martyn's translation. " *Stem* thread-shaped, erect, frequently quite simple; hirsute, as is the whole plant, especially the calyx. *Leaves* almost like those of *Thymus serpyllum*, sessile, opposite, acute, veinless, obscurely three-nerved; the lowest smaller, approximating, ovate; the upper oblong, remote, three lines long. *Flowers* in a terminal sessile head, the size of a pea. This plant is a finger's length in height, or more, but never so gigantic as Aublet has drawn it, according to an observation of Van Rohr, an eye-witness, who gathered it in Guiana."

MATPUT, in *Geography*, a town of Persia, in Chulistan; 15 miles N.E. of El-Tih.

MATPY'S ISLAND, an island in the Pacific ocean, discovered by Capt. Carteret in 1767. S. lat. 145. E. long. 143° 2'.

MATUARO, an island near the N.E. coast of New Zealand, on the S.E. side of the Bay of Islands. S. lat. 35°. E. long. 156 28'.

MATUGUAN, a town of Peru, in the audience of Lima; 60 miles N. of Guanacavelica.

MATVIEV, an island of Russia, in the Straits of Vagatskoi. N. lat. 69 15'. E. long. 52 14'.

MATVIEVKA, a town of Russia, in the government of Ekaterinoflav, on the Bug; 40 miles N.W. of Cherson.

MATUUI, in *Ornithology*, a name given by Ray, Willughby, and Buffon, to the Brazilian spotted king-fisher of Latham, or *Alcedo maculata*. See ALCEDO.

MATUIFUI, a name given by Maregrave to the sea-lark or ringed-plover. See CHARADRIUS *Hiaticula*. See also TANTALUS *Gristus*.

MATULAM, *Hydrops ad Matulam*. See HYDROPS.

MATURA, in *Geography*, a small village and fort at the southernmost point of Ceylon; 30 miles E. of Point de Galle. (See GALLE.) The country round Matura is very wild, but well supplied with provisions of all sorts, and particularly game, which is abundant. The house for the commandant is tolerably good, agreeably situated near the river, which is broad here, and runs into the sea at a small distance. The circumjacent country abounds with elephants, and here they were principally caught for exportation. Every three or four years the elephant is hunted here, by order of government. In 1797, at one of these hunts, 176 were caught, and this was the greatest number ever known to be taken at one time. Matura is four miles distant from *DONDRE Head*; which see.

MATURA, a chain of villages of Egypt, on the right bank of the Nile; 12 miles N. of Enfeneh.

MATURANTIA, in *Medicine*, &c. *ripeners*; or such things as promote maturation; are supposed to favour the production and complete formation of pus in inflammatory humours. There are, certainly, says Dr. Cullen, means which may be employed for favouring these operations of nature; but as it cannot be admitted that any medicines are endowed with any specific powers to this purpose, the term, as applied to medicine, seems to be quite improper. See SUPPURATION.

MATURAQUE, in *Ichthyology*, the name of an American fish, of the harengiform kind, and having only one short fin on the back. It seldom grows to more than four inches long, and is somewhat flattish, but not very broad; its head is very broad, and covered with a shelly crust; it is caught in lakes, not in rivers, and is a well-tasted fish.

MATURATION OF FRUIT, in *Gardening*. See CAPRIFICATION, FORCING, and HOT-BEDS.

MATURATION, in *Pharmacy*, a preparation of fruits, or other simples, gathered before their maturity, to fit them to be eaten, or for other uses. See FRUIT, &c.

MATURU,

MATURU, in *Geography*, a town of Brazil, on the river Xingi; 45 miles S.W. of Curupa.

MATUSARUM, in *Ancient Geography*, a town of Lufitania, S.E. of Scalabis. The Itinerary of Antonine marks it upon the route from Lisbon to Emerita.

MATUSFALVA, in *Geography*, a town of Hungary; 25 miles N.E. of Cafchau.

MATY, MATTHEW, in *Biography*, a physician and man of letters, was the son of a refugee Protestant clergyman, from Beaufort in Provence, and was born at Montfort, near Utrecht, in 1718. He was originally intended for the clerical profession; but, in consequence of some mortifications which his father had received from the synod, on account of his sentiments relative to the Trinity, his attention was turned to the profession of medicine. He graduated at Leyden in 1740, and came to settle in England, his father having determined to quit Holland for ever. In 1747, he published at Leyden, "Essai sur le Caractère du Grand Medecin, ou Euloge critique de Boerhaave." Three years afterwards he began to publish at the Hague, in French, an account of the principal books printed in England, under the title of "Journal Britannique." This journal was well received, and answered the chief end which he had in view, by introducing him to the notice of some of the most respectable literary characters of the country, which he had adopted as his residence, and to whose active and uninterrupted friendship he owed the places which he afterwards obtained. At the institution of the British Museum in 1753, he was appointed an under-librarian; and at the death of Dr. Knight, in 1772, he became principal librarian to that establishment. In 1758 he was elected a fellow of the Royal Society; and in 1765, on the resignation of Dr. Birch, who soon afterwards died, and made him his executor, he was chosen secretary to that learned body. He filled these offices with great reputation, and was in general esteemed for the benevolence of his private character, and the extent of his literary information. He died in 1776. In his medical capacity, Dr. Maty was distinguished as an active and zealous promoter of the practice of inoculating the small-pox; and actually re-inoculated himself, unknown to his family, in order to disprove the supposition that it might be produced a second time in this way. He translated, in 1768, Dr. Gatti's "New Observations on Inoculation," which had been originally written by the author at his request. He had nearly completed, at the time of his death, the "Memoirs of the Earl of Chesterfield," which were finished by his son-in-law, Mr. Justamond, and prefixed to an edition of the "Miscellaneous Works" of that nobleman, in 1777. Gen. Biog. Hutchinson's Biog. Med. Anecdotes of Bowyer.

MATY, PAUL-HENRY, son of the preceding, was born in 1745. He was educated at Westminster-school, whence, in 1763, he was elected to Trinity college, Cambridge, and obtained from thence a travelling fellowship. He passed three years on the continent, after which he was appointed chaplain to lord Stormont, ambassador at the court of France. He might, from his connections, have secured preferment in the church, but scruples concerning its doctrines and ceremonies prevented him from continuing to perform the duties of a minister in it. After his father's death he retired from its service, and, in 1777, he published his reasons for this step. From this period he devoted himself to a literary life, and was almost immediately appointed assistant librarian to the British Museum; he was elected one of the under librarians, and likewise succeeded Dr. Horsley as one of the secretaries of the Royal Society. In 1782 he commenced a review of select works, English and

foreign, which he carried on almost without any assistance till 1786. He died, in the following year, at the age of forty-two. Mr. Maty published a translation of Riefbeck's travels through Germany, and translated into the French language the descriptions in the "Gemmæ Marlburienfes." After his death a volume of sermons was published for the benefit of his family: they are spirited and original compositions; but the editor, through some inadvertence, printed, as Mr. Maty's, three that had been copied from the sermons of archbishop Secker. Gen. Biog.

MATYLUS, in *Ancient Geography*, a town of Pamphylia, placed by Ptolemy between the mouth of the river Catactus and that of the river Cafer.

MATZEN, in *Geography*, a town of Austria; seven miles S. of Zillerstorff.

MATZENDORF, a town of Switzerland, in the canton of Soleure; six miles N. of Soleure.

MATZOL, a cape of Russia, at the mouth of the Ob-skaia gulf. N. lat. 72° 30'. E. long. 75° 30'.

MATZUNEA, a town of Poland, in the palatinate of Kiev; 24 miles S.W. of Kiev.

MAU, a town of the island of Ceylon; 40 miles W.N.W. of Candi.

MAVA, a river of Africa, which passes through the country of Quoja, and runs into the Atlantic near cape Monte.

MAUBAL, a town of Candahar; 65 miles N.N.E. of Candahar.

MAUBECHÉ, in *Ornithology*, a name given by Buffon to the TRINGA *Calidris*; which see.

MAUBEUGE, in *Geography*, a town of France, in the department of the North, and chief place of a canton, in the district of Avesnes, situated on the Sambre. The place contains 4726, and the canton 14,084 inhabitants, on a territory of 205 kilometres, in 32 communes. N. lat. 50° 16'. E. long. 4° 2'.

MAUBOURGUET, a town of France, in the department of the Upper Pyrenées, and chief place of a canton, in the district of Tarbes; 15 miles N. of Tarbes. The place contains 1400, and the canton 7345 inhabitants, on a territory of 102½ kilometres, in 11 communes.

MAUCAUCO, in *Zoology*. See LEMUR and VIVERRA *Caudivolvula*.

MAUDERDALLY, in *Geography*, a town of Hindoostan, in Coimbatore; 10 miles W.N.W. of Coimbatore.

MAUDIHOCA, the cassida, or the poisonous root of which bread is made in many parts of the West Indies.

MAUDISIMILIA, in *Geography*, a town of Hindoostan, in Bahar; 35 miles S.E. of Bahar.

MAUDLIN, in *Botany*. See YARROW, and AGERATUM.

MAUDUIT, JACQUES, in *Biography*, said by M. Laborde to have been a great musician in the time of Henry IV. who accompanied wonderfully on the lute. (Essais sur la Mus. t. iii. p. 519.) We are likewise told, that he added a sixth string to viols, which had originally but five; and that he was the first in France who introduced these instruments in concert, instead of base-viols.

Père Merfenne, who had a particular regard for this musician, has given us an engraved head and eulog of him in his "Harmonie Univerfelle;" with the chief part of which we shall present our readers.

"Jaques Mauduit, descended from a noble family, was born in 1557. He had a liberal education, and travelled during his youth into Italy, where he learned the language of that country, together with Spanish and German, which, with the literature he had acquired at college, enabled him

to read the best authors of almost every kind. He had a general knowledge of most sciences as well as mechanics; and studying music with unwearied diligence without any other assistance than that of books, he rendered himself so eminent, that he was honoured, even during life, with the respectable title of *Père de la Musique*, "father of music." "And with reason," says his panegyrist, "he was the inventor of good music in France, by the many excellent works he published, both vocal and instrumental, which have been long the ornament of our concerts."

"His merit obtained him admission into the famous Academy of Music, instituted by the learned B. 1583; and many writers of his time seem to have produced their poetical effusions, in order to have them immortalized by the airs of Mauduit.

"The first composition in which he distinguished himself as a learned harmonist, was his mass of Requiem, which he set for the funeral of his friend, the celebrated poet Ronsard; it was afterwards performed at the funeral of Henry IV. and, lastly, at his own, 1627, under the direction of his son Louis Mauduit, at which ne Merfennus officiated in the sacred function as priest.

"He left behind him innumerable masses, hymns, motets, fancies, and songs. A small hereditary place at the court of requests descended to him from his father, which he seemed to exercise for no other purpose than to oblige and serve his friends. At the siege of Paris, when the Faubourg was taken by storm, he ventured through the victorious soldiers to the house of his friend Baillet, then dead, and saved all his manuscripts, at the hazard of his own life.

"Upon a similar occasion, in which there was still greater difficulty and danger, he saved the *douze moe* de Claude le Jeune, and his other manuscript works, at the time that this composer was seized at the gate of St. Denis as a Hugonot; so that all those who have since received pleasure from the productions of this excellent master, are obliged to Mauduit for their preservation, as he saved them from destruction by seizing the arm of a serjeant at the very instant that he was going to throw them into the flames; persuading the soldiery that these papers were perfectly innocent and free from Calvinistical poison, or any kind of treason against the League: and it was by his zeal and address, with the assistance of an officer of his acquaintance, that Claude escaped with his own life."

Such are the praises bestowed upon Jaques Mauduit, by his friend the learned and benign Merfennus, whose diligence, science, and candour, far surpassed his taste. The Requiem, by Mauduit, is printed in the Harm. Univ. in five separate parts; but in scoring it, neither the harmony nor modulation offer any thing that is either curious or uncommon, at any period of counterpoint. It is in literally plain counterpoint of crotchets and minims moving all together, as in our cathedral chanting. The chief merit of this production is in the exact accentuation of the words, *à l'antique*: a minim for a long syllable, and a crotchet for a short.

Merfennus, in his Commentary on Genesis has illustrated his musical remarks with many of his friend Mauduit's compositions, in which we have never been able to dig out the least fragment that would do honour to this composer or his country.

MAVEBARA, in *Geography*, a town of South America, in the province of Choco; 20 miles N. of Zitara.

MAVELAGONGUE, a river of Ceylon, which runs into the sea at Trincomalee.

MAVELICAN, a town of Hindoostan, in the Carnatic; 40 miles from Travancore.

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MAVENHELLY, a town of Hindoostan, in the Mysore, ceded to Great Britain in 1799; 60 miles S.E. of Seringapatam.

MAUG, TUNAS, or *St. Laurence*, one of the smaller of the islands called "Ladrones," composed of three rocks, about 20 miles in circumference; 15 miles from the island of Assumption.

MAUGERVILLE, a township of Sunbury county, in the province of New Brunswick, in St. John's river, 30 miles above Belisle. N. lat. 45° 59'. W. long 66° 40'.

MAUGHOLD HEAD, a cape on the E. coast of the Isle of Man; 40 miles W.S.W. from St. Bee's Head. N. lat. 54° 18'. W. long. 3° 28'.

MAUGSEE, three small islands in the East Indian sea, between Bornes and Paraguay. N. lat. 7° 33'. E. long 117° 30'.

MAUGUIO, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier; six miles E. of Montpellier. The place contains 1167, and the canton 3386 inhabitants, on a territory of 160 kilometres, in five communes.

MAUHLLIA, in *Botany*. Dahl. Ohf. Bot. 25. Thunb. Prod. 60, is the same genus with the *Azapanthus* of Solander in Ait. Hort. Kew. ed. 1. v. 1. 414, the *Tulbaghia* of Heister; see AGAPANTHUS. The only genuine species is *Azapanthus umbellatus*. Curt. Mag. t. 500. Redout. Liliac. t. 6. (*Crinum africanum*; Linn. Sp. Pl. 419.) Thunberg however has added a second, by the name of *Mauhllia ensifolia*, and he is followed by Willdenow; but their plant is our *Massonia ensifolia*. See MASSONIA.

The name of *Mauhllia* was given by Dahl, (see DAILIA,) in honour of Mr. John Mauhle, who, as this author informs us, had for many years the superintendance of the Swedish mercantile affairs in China; and has, since his return, laboured, with great ardour, to promote various economical objects at home. He is said to have furnished Dahl with the sum necessary for the purchase of the Linnæan Museum; (see LINNÆUS the son,) in order that it might not go out of Sweden; and the narrator above-mentioned asserts that "the same sum of money for which it passed into foreign hands, was offered to retain it." This assertion bears hard upon the honour and patriotism of the highly respectable professor Acrel, who alone was entrusted with the sale of the collection in question, and we have his authority to say the account is incorrect. We know also that this excellent man was falsely accused of having received a bribe from the actual purchaser, because he behaved honourably and impartially in his trust; and we know moreover that he did reject with indignation an offer, from another quarter, to betray it. He had even to resist the dishonest cupidity of the heirs of the younger Linnæus, who, on receiving unlimited offers from the empress of Russia, would have left in the lurch the person with whom they were in treaty, and who did not hesitate to purchase the whole at their own price, and in their own way. S.

MAVILE, in *Geography*, a town of Hindoostan, in the circle of Cicacole; 27 miles S.W. of Cossimbotta.

MAVIS, in *Ornithology*, the common name of the song-thrush, or throistle. See TURTUS *musicus*.

MAUKS, in *Agriculture*, a provincial word applied to maggots.

MAUL, in *Rural Economy*, a provincial term signifying a beetle, mallet, &c.

MAULDAH, in *Geography*, a circle of Bengal, of a triangular form, and about 45 miles in circumference; situated between Rajamal and Dinagepour.—Also, the capital

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of

of the said circar, which is a place of considerable trade; 52 miles N. of Moorshedabad. N. lat. $25^{\circ} 3'$. E. long. $88^{\circ} 16'$.

MAULE, a river of Chili, which runs into the Pacific ocean, S. lat. $35^{\circ} 12'$.

MAULEN, a town of Prussia, in the province of Nantangen; seven miles S.W. of Konigsberg.

MAULEON, a town of France, and chief place of a district, in the department of the Lower Pyrenées, having a castle on a rock, formerly deemed impregnable; 12 miles W. of Oleron. The place contains 1010, and the canton 12,497 inhabitants, on a territory of $317\frac{1}{2}$ kilometres, in 28 communes. N. lat. $43^{\circ} 13'$. W. long. $0^{\circ} 49'$.

MAULEON-en-Barouffe, a town of France, in the department of the Upper Pyrenées, and chief place of a canton, in the district of Bagnères; nine miles S.E. of La Barthe. The place contains 612, and the canton 6495 inhabitants, on a territory of 185 kilometres, in 25 communes.

MAULI, a river of Sicily, which runs into the sea, about eight miles S.S.W. from Ragusa. N. lat. $36^{\circ} 40'$. E. long. $13^{\circ} 45'$.

MAULIAVERAM, or SEVEN PAGODAS, a town of Hindoostan, in the Carnatic, situated on the coast; 30 miles S. of Madras.

MAULPOUR, a town of Hindoostan, in Lahore; 10 miles N. of Rahoon.

MAULSURDA, a town of Bengal; 55 miles S.S.W. of Doefa.

MAUM, in *Agriculture*, a term provincially signifying a certain dry mellow quality in land. A sort of dry fine loam.

MAUMUSSON, in *Geography*, a channel or narrow sea between the isle of Oleron and the continent of France.

MAUNCH, in *Heraldry*, the figure of an ancient sleeve of a coat, which is borne in many gentlemen's escutcheons; as in the earl of Huntingdon's.

MAUNCORE, in *Geography*, a town of Bengal; 20 miles N.W. of Burdwan.

MAUND, in our *Old Writers*, a kind of great basket or hamper, containing eight bales, or two fats; it is commonly a quantity of eight bales, of unbound books, each bale having one thousand pounds weight.

MAUND, in *Commerce*, the denomination of a weight in the East Indies. In Bengal heavy goods are weighed by the maund of 40 seers, each seer being divided into 16 chittacks. The maund of the English factory in Bengal weighs 74lb. 10 oz. $10\frac{3}{4}$ dr. avoirdupois; so that the seer is 1lb. 13 oz. $13\frac{3}{4}$ dr. and the chittack 10z. $13\frac{3}{4}$ dr. The Bengal Bazar maund is 10 per cent. heavier than the maund of the factory, and therefore weighs 82lb. 2oz. $2\frac{3}{4}$ dr. avoirdupois; and in this case, the seer is 2lb. 0 oz. $13\frac{3}{4}$ dr., and the chittack, 2oz. $0\frac{3}{4}$ dr. Grain is sold by the Khahoon of 16 foallee, which is equal to 40 maunds. Liquids are sold by the chatack of 5 ficca weight; 16 chatacks making 1 pouah, 4 pouah 1 seer, and 40 seers 1 maund. At Madras goods are sold by the candy of 20 maunds, and the maund is divided into 8 vis, 320 pollams, or 3200 pagodas. The candy of Madras is 500lb. avoirdupois. In the Jaghire, or territory belonging to the English company round Madras, and in most other parts of the Coromandel coast, the Malabar weights are used, and are as follow: the gurfay, called by the English garce, contains 20 baruays or candies; the baruay, 20 manungus or maunds; the maund 8 visay or vis, 320 pollams, or 3200 varahun; each varahun weighing $52\frac{3}{4}$ English grains; so that the visay is 3lb. 3 dr., the maund, 24lb. 2oz., the baruay, $482\frac{3}{4}$ lb., and the gurfay $9645\frac{1}{2}$ lb.

avoirdupois; 4 tons 6cwt. nearly. In corn measure, the garce is $=\frac{1}{2}$ English quarters nearly. When grain is sold by weight, $6\frac{1}{2}$ lb. are reckoned for 1 garce, being 18 candies $12\frac{1}{2}$ mds. At Bombay the commercial weight is the candy 20 maunds, the maund being subdivided into 40 seers, and the seer into 30 pice. The candy is 560lb., the maund 20., and the seer $11\frac{1}{2}$ oz. avoirdupois. Goods are likewise sold by the Surat maund, and the Pucca or Bengal mau, so that, in every contract, the particular maund, or seer, should be mentioned. A bag of rice weighs 6 mds, or 168lb. avoirdupois, and a candy is equal to 25 Winchester bushels nearly. At Calicut, on the Malabar coast the candy weight contains 20 maunds, and the maund 100pools or paloos. The maund used here by the English weighs 30lb., and the candy, 600lb. But the common weights are those of Malabar, the maund weighing 24lb. 2oz., and the candy $482\frac{1}{2}$ lb. avoirdupois. At Carwar, on the Malabar coast, the maund is 26lb. avoirdupois, and is divided into 10 seers or 1000 pice, and the candy is 20 maunds. At Cochin the maund is 27lb. $2\frac{3}{4}$ oz. avoirdupois, and the candy = 20 maunds = 543lb. 8 oz. avoirdupois. At Goa the maund contains 24 rattles, = $24\frac{3}{4}$ lb. avoirdupois, so that the candy of 20 maunds is equal to 495lb. avoirdupois. Corand rice are sold by the candy of 20 maunds, which are equal to 14 English bushels nearly. At Mangalore, the manor maund, by which goods are sold in the market, contains 46 seers, or 28lb. $2\frac{1}{4}$ oz. avoirdupois: the maund, by which the merchants buy and sell, weighs 16 rupees more, that is 28lb. $4\frac{1}{2}$ oz. avoirdupois; the baru or candy is 20 maunds. At Malulipatam the candy is 20 maunds, the maund 8 v, 40 seers, 600 neves, or 900 dabous. This maund weighs $4\frac{1}{2}$ lb. avoirdupois nearly. At Pondicherry the commercial weight is the candy of 20 maunds, or 160 vis. The maund is = 24lb. French poids de marc, or 25lb. 14oz. $5\frac{1}{4}$ dr. avoirdupois. At Scindy heavy goods are weighed by the maund of 40 seers. The cutcha or Surat maund is = 7lb. 5oz. $5\frac{3}{4}$ dr. avoirdupois, and is divided into 16 annas, or 32 pice; the Pucca maund is double the former. At Surat, the maund for weighing heavy goods is 40 seers, and the seer 30 pice: 20 Surat maunds, or 10 Pucca or Bengal factory maunds make 1 candy, or 746lb. 10oz. 10dr. avoirdupois. But these weights vary. At Tranquebar the maund weighs 68lb. Danish, or $74\frac{1}{2}$ lb. avoirdupois. At Acheen, in the isle of Sumatra, a maund of 75lb. of rice contains 21 bamboes, a bamboe being 4 and sometimes 5 cauls. Kelly's Cambist. vol. i.

MAUNDA, in *Geography*, a town of Bengal; 30 miles N.W. of Natore.

MAUNDAR, a town of Bengal; 10 miles W. of Midnapour.

MAUNDY, or MAUNDEY *Thursday, Dies Mandati*, the Thursday before Easter; so called from the French *mande*, i. e. *portula*; it being a custom on that day to give a largess or bounty to certain poor men, whose feet the king formerly washed, as a mark of humility, and in obedience to the command of Christ.

MAUNDYGAUT, in *Geography*, a town of Hindoostan, in the foubah of Delhi; 27 miles E.N.E. of Secundara.

MAUNSEE, a town of Austria, near a lake of the same name; 16 miles S.W. of Voglabruck.

MAUNSI, a river of Bengal, which falls into the Toorha, and after their confluence they assume the name of Neelcoomer, and shaping their course through Baharbund, fall with their united streams into the Berhampooter.

MAUNTRY,

MAUNTRY, a town of Hindoo tan, in Mohurbunge; 12 miles S. of Harriourpour.

MAUPERTUIS, PETER-LEWIS MOREAU DE, in *Biography*, a celebrated French mathematician and philosopher, who flourished in the eighteenth century, was born at St. Malo in the year 1698. He was privately educated till he was sixteen years of age, when he was sent to the college of La Marche, at Paris. He shortly discovered a strong inclination to mathematical pursuits, and a considerable taste for instrumental music, which he practised with success. At the age of twenty he determined on a military life, and entered among the mousquetaires, but after remaining two years in that corps, he obtained a company in a regiment of cavalry, which he held about three years. During this time he devoted all his leisure hours to scientific studies, and at length he quitted the profession of arms, and applied his mind entirely to mathematics. In 1723 he was received into the Royal Academy of Sciences, on which occasion he read his first performance, which was "A Memoir upon the Construction and Form of musical Instruments." He now paid a good deal of attention to natural philosophy, and discovered great knowledge and dexterity in observations and experiments upon animals. In 1728 he, with all the zeal of a devotee, visited the country which had given birth to Newton, of whose principles he became a zealous admirer and follower; and during his residence in London he was honoured with an admission into the Royal Society. Upon his return to France, he made an excursion to Basil, where he formed a friendship with the celebrated Bernouillis. On his return to Paris from Switzerland, he applied to his favourite studies with redoubled ardour, and enriched the transactions of the academy with a vast number of his communications, between the years 1724 and 1744. In some of these the most sublime and intricate questions in the mathematical sciences are discussed with precision, clearness, and elegance. In 1736, he was sent by Lewis XV., at the head of the French mathematicians, into Lapland, for the purpose of measuring a degree of the meridian within the polar circle, in order to determine the figure of the earth. The reputation which he acquired by this undertaking was so great, that he was admitted a member of almost every academy in Europe. In 1740 he was invited by the king of Prussia to go to Berlin, to be the president and director of the Royal Academy of Sciences and Belles Lettres in that place, which he readily accepted. When he arrived, the king was at war with the emperor, and our philosopher, whose love for his first profession of arms was not entirely effaced, determined to follow the king to the field. He was present at the battle of Molwitz; but before victory declared itself for the Prussians, his horse ran away with him into the enemy's ranks, where he was taken prisoner, and very roughly used. Being carried to Vienna, he there met with the most honourable reception from the emperor. This noble-minded prince, hearing him regret the loss of a watch by Graham, the celebrated English artist, which had been of great use to him in his experiments and astronomical observations, having another by the same maker, but enriched with diamonds, presented it to him, saying, "The hussars were only in jest with you. they have sent me your watch, and I gladly restore it to you." Notwithstanding his talents as a philosopher and mathematician, he was capable of paying well turned compliments to persons of the highest rank in life: in the course of conversation with the empress-queen, her majesty observed to him that she had heard the princess Louisa-Ulrica of Prussia was the most beautiful princess in the world. "Till this moment, madam," replied Maupertuis, "I was entirely of that opinion." He was soon after-

wards allowed to depart for Berlin, loaded with favours by the emperor and empress. From thence Maupertuis went to Paris, and in 1742 was chosen director of the Academy of Sciences: during the following year he was received into the French Academy, and was the first instance of a person being member of both the academies of Paris at the same time. After this he again assumed the character of a soldier, and was present at the siege of Fribourg, and, upon the surrender of that citadel, was appointed to carry the news of the event to the French king. In 1744 he returned to Berlin, and married a lady of great beauty and merit, to whom he was extremely attached, and his alliance with whom he considered as the most fortunate event of his life. In 1746, the king of Prussia declared our philosopher president of the Royal Academy of Sciences at Berlin, and soon afterwards honoured him with the order of Merit; and farther distinguished him with his own most intimate confidence. These accumulated honours served to stimulate him in his application to scientific researches, not only in mathematics, but in metaphysics, chemistry, botany, and polite literature. His temper was not good, and he was frequently involved in disputes with persons of distinguished talents: one of these was with Koenig, professor of philosophy at Francker, in which Voltaire took a decided part against him. Maupertuis threatened to take on him personal revenge, to which Voltaire replied by reiterating the strokes of the most ludicrous satire. The constitution of the philosopher had been long impaired by fatigues of various kinds, and particularly by the hardships which he had undergone in his Lapland expedition; but the vigour of his mind was unabated, even at a time when, from severe illness, he was incapable of taking the chair of the academy. He died in 1759, when he was about the age of sixty-one. He was author of many works, of which the following may be noticed; "An Essay on Cosmology;" "A Discourse on the different Figures of the Stars;" "Philosophical Reflections upon the Origin of Languages, and the Signification of Words;" "An Account of the Expedition to the Polar Circle, for determining the Figure of the Earth, or, the Measure of the Earth at the Polar Circle;" "Observations on the Comet of 1742;" "The Measure of a Degree of the Meridian at the Polar Circle."

MAUPHAZE-BUNDER, in *Geography*, a town of Hindoo tan, in the circar of Cicacole; 4 miles S.E. of Cicacole.

MAUPIN, LA, in *Biography*, one of the early and most extraordinary female singers in the operas of Lullu. M. Laborde has assigned, in his "Essais sur la Mus.," a piquant article to most of the favourite performers in these splendid musical dramas, with which Louis XIV. and the whole French nation were so delighted and so proud. Almost every individual of this syren troop is marked by some singularity of character, or peculiar circumstances; but none more so than La Maupin, the successor of La Rochois. She was equally fond of both sexes: fought and loved like a man, and resisted and fell like a woman. Her adventures are of a very romantic kind. Married to a young husband, who was soon obliged to absent himself from her, to enter on an office he had obtained in Provence, she ran away with a fencing-master, of whom she learned the small-sword, and became an excellent fencer, which was afterwards a useful qualification to her on several occasions. The lovers first retreated from persecution to Marseilles; but necessity soon obliged them to solicit employment there, at the opera; and, as both had by nature good voices, they were received without difficulty. But soon after this she was seized with a passion for a young person of her own sex, whom she seduced;

duced; but the object of her whimsical affection, being pursued by her friends and taken, was thrown into a convent at Avignon, where the Maupin soon followed her; and having presented herself as a novice, obtained admission. Some time after, she set fire to the convent, and, availing herself of the confusion she had occasioned, carried off her favourite. But being pursued and taken, she was condemned to the flames for contumacy; a sentence, however, which was not executed, as the young Marseillaise was found, and restored to her friends.

She then went to Paris, and made her first appearance on the opera stage in 1695, when she performed the part of Pallas, in "Cadmus," with the greatest success. The applause was so violent, that she was obliged, in her car, to take off her casque to salute and thank the public, which redoubled their marks of approbation. From that time her success was uninterrupted. Dumeni, the singer, having affronted her, she put on men's clothes, watched for him in the Place des Victoires, and insisted on his drawing his sword and fighting her; which he refusing, she caned him, and took from him his watch and snuff-box. Next day Dumeni having boasted at the opera-house, that he had defended himself against three men who attempted to rob him, she related the whole story, and produced his watch and snuff-box in proof of her having caned him for his cowardice. Thevenard was nearly treated in the same manner, and had no other way of escaping her chastisement than by publicly asking her pardon, after hiding himself at the Palais Royal during three weeks. At a ball given by Monsieur, the brother of Louis XIV., she again put on men's clothes, and having behaved impertinently to a lady, three of her friends, supposing the Maupin to be a man, called her out. She might easily have avoided the combat by discovering her sex, but she instantly drew, and killed them all three. Afterwards, returning very coolly to the ball, she told the story to Monsieur, who obtained her pardon. After other adventures, she went to Brussels, and there became the mistress of the elector of Bavaria. This prince quitting her for the countess of Arcos, sent her by the count, husband of that lady, a purse of 40,000 livres, with an order to quit Brussels. This extraordinary heroine threw the purse at the count's head, telling him, it was a recompence worthy of such a scoundrel and — as himself. After this she returned to the opera stage, which she quitted in 1705. Being at length seized with a fit of devotion, she recalled her husband, who had remained in Provence, and passed with him the last years of her life in a very pious manner, dying in 1707, at the age of thirty-four.

MAUR, in *Geography*, a town of Austria; 7 miles S. of Mauttern.

MAUR, *St.*, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Chinon; 15 miles S.E. of Chinon. The place contains 2271, and the canton 8357 inhabitants, on a territory of 185 kilometres, in 12 communes.—Also, a town of France, in the department of Paris; 6 miles S.E. of Paris.

MAUR, *St.*, *Congregation of*, in *Ecclesiastical History*, a famous society of Benedictines, which was founded in the year 1620, by the express order of Gregory XV., and enriched by Urban VIII. in 1627, with several donations and privileges. This society has been distinguished by the great number of excellent rules and institutions that are observed in it, and by the regular lives and learned labours of its members. Those who have any acquaintance with the history and progress of learning in Europe, well know what signal advantages the republic of letters has derived from the establishment of this famous congregation, whose numerous

and admirable productions have cast a great light upon all the various branches of philology and belles lettres, and whose researches have taken in the whole circle of sciences, philosophy excepted. These Benedictines still maintain their literary fame, by the frequent publication of laborious and learned productions in all the various branches of sacred and profane literature.

MAURACONDA, in *Geography*, a town of Africa, in the kingdom of Burfali. N. lat. 13° 40'. W. long. 15° 25'.

MAURANDIA, in *Botany*, received its name from Dr. Ortega, the professor of botany at Madrid, in honour of the lady of Dr. Maurandy, the botanical professor at Carthage, said to be an ardent admirer and prosecutor of the same study with her husband. Cavanilles had given the generic appellation of *Ustria* to this plant, not being aware of its having been previously bestowed on another genus by Willdenow; for which reason, joined to that of complimenting the above-named lady on her botanical acquirements, Ortega was induced to change it to *Maurandya*. In the Botanical Magazine we perceive that Dr. Sims, though he has adopted the genus, is not perfectly satisfied with it, or rather that "he cannot cordially coincide with Dr. Ortega, in the propriety either of his generic or trivial name." We content ourselves with reforming his orthography. *Orteg. Hort. Matrit. dec. 2. 21. Jacq. Hort. Schoenb. v. 3. 20. Willd. Sp. Pl. v. 3. 389. (Ustria; Cavan. Ic. v. 2. 15.)*—Class and order, *Didymia Angiospermia*. Nat. Ord. *Perfonate*, Linn. *Bignonia*, Juss.

Gen. Ch. *Cal.* Perianth inferior, permanent, cloven nearly to the base into five linear-lanceolate, acute, erect, almost equal segments. *Cor.* of one petal, two-lipped; tube shorter than the calyx; throat twice as long as the calyx, rather depressed, broad, with various furrows on each side, somewhat incurved; limb ringent, in five nearly equal, roundish, emarginate segments, two above and three below. *Stam.* Filaments four, thickened and hairy at the base, not so long as the throat of the corolla, two of them shorter; anthers oblong. *Pist.* Germen superior, ovate, with a furrow on each side; style awl-shaped, the length of the stamens; stigma simple. *Peric.* Capsule as long as the calyx, of two cells, each opening at the top with five, half-ovate, acute, reflexed valves. *Seeds* numerous, rather ovate, rough, affixed to each side of the partition.

Eff. Ch. Calyx inferior, in five deep segments. Corolla ringent; tube bell-shaped, furrowed. Capsule of two cells, opening by five teeth at their summit.

1. *M. semperflorens*. Climbing Maurandia, or Bastard Foxglove. Sims in Bot. Mag. t. 460. Jacq. Hort. Schoenb. t. 288. *Ustria scandens*; Cavan. Ic. t. 116. Andr. Bot. Repos. t. 63.

This, the only species known, is a native of Mexico, and an elegant greenhouse plant, flowering for months together in the summer. *Root* perennial, branched, sending forth numerous, annual, climbing, round, darkish, branched stems, about the thickness of a quill. *Branches* green, about three feet long, somewhat divided. *Leaves* alternate, on long twining footstalks, very numerous, spear-shaped, three, five, or seven-nerved. *Flowers* solitary, drooping, on long, twisted, axillary stalks, of a beautiful lilac, or purple and white, colour. They have great affinity to those of the Foxglove. *Seeds* oblong and black.

This truly elegant climber, which is beautifully figured in the works above quoted, from being easily propagated by cuttings as well as seeds, seems in a fair way of becoming common in our greenhouses, though said to be rather better suited to the conservatory.

MAURBACH, in *Geography* a town and chateaux of Austria; nine miles W.N.W. of Vienna.

MAURE, *Mademoiselle* CATHARINE NICOLE LE, in *Biography*, one of the last favourite singers in the French serious opera of the old school. She was born at Paris in 1704, and, according to M. Laborde, gifted with the finest voice that nature ever bestowed on a mortal. She was admitted, in 1719, only as a chorus-singer, and remained in that humble station till 1724, when she appeared in the character of Cephile, in the first part of "L'Europe Galante."

From that moment she never ceased to delight the audience, even to extacy, in every part that was assigned her. Her beautiful voice, manner of singing, and embellishments, were equally captivating. Mademoiselle le Maure, diminutive in figure, and ill made, moved on the stage with incredible dignity; she penetrated every heart so much by what she had to utter, that she drew tears from hearers the most frigid; she animated and transported them; and though she had neither beauty nor wit, she excited the most lively sensations.

She quitted the stage and returned to it several times, till 1743, after which period she never performed in public, except in the festivals given in celebration of the dauphin's first marriage, in 1745.

Her retreat was rather occasioned by caprice than fading talents; she might have remained on the stage ten years longer with her usual eclat. For after her retirement we have very frequently been present (continues M. Laborde) when she has sung and acted whole operas without appearing fatigued. The undertakers of the Colifée prevailed upon her to sing two or three times in 1771, and there never was so great a crowd assembled at a public place as she attracted to hear her. Mademoiselle le Maure continued to the end of her life superior to what might be expected from her age.

No one could dispute the perfection of her voice; and even young people, though a great change was begun in our music, found the charms of her vocal organs irresistible.

It would be an interesting inquiry to investigate the cause of that exquisite pleasure which the mere tone of a fine voice excites, without the concurrence of any reasoning faculty. Mademoiselle le Maure had no imposing figure, was neither pretty, nor gifted with superior intellects or reflections, without tale or education; yet, denied all these advantages, she had only to open her mouth, and breathe two or three sounds, to produce every effect resulting, with great difficulty, from the union of all the advantages of which she was in want. To what are we to ascribe this prodigy? It is one of those mysteries of nature which philosophy has not yet unfolded.

Mademoiselle le Maure, in 1762, was married to M. de Monbruelle; but she still remained best known, after her marriage, by her maiden name; so true it is that our place in society is determined by talents and useful faculties.

MAURE, in *Geography*, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Rédon; 15 miles N. of Rédon. The place contains 4110, and the canton 8370 inhabitants, on a territory of 205 kilometres, in nine communes.

MAURE, *St.*, or *Leucadia*, an island in the Mediterranean sea, about 50 miles in circumference, formerly joined to the continent, but now separated from it. (See LEUCADIA.) This island produces great plenty of game, wine, oil, citrons, pomegranates, almonds, and other fruits, with fine pastures. Its inhabitants are Greeks, subject to a bishop. It had formerly three considerable towns, with a very magnificent

temple of Venus. The town which gives name to the island, contains about 6000 inhabitants; as it is situated in the water, and defended by walls and towers, it is not easy of access either by land or water. Beyond its works, in a moorass, are two well inhabited islands, or suburbs; and the little islands between this and the continent communicate by bridges. It has repeatedly changed master, being sometimes under the dominion of the Turks, and sometimes under that of the Venetians. By the treaty of Campo Formio it was ceded to France; but in 1799, it was declared one of the seven islands formed into a republic. N. lat. 39° 4'. E. long. 20° 39'.

MAUREPAS, JOHN FREDERIC PHILIPPEAUX, *Count des*, in *Biography*, a French statesman, was born in 1701, and in 1715 was appointed secretary of state; which, considering his youth, must have been a sinecure. In 1723, he was made superintendent of the marine, and, in 1738, minister of state. By the intrigues of madame Pompadour he was exiled to Bourges in 1749. He was not recalled till 1774, when Louis XVI. entrusted the public affairs to his management. He attended greatly to the marine department, and was a liberal encourager of the sciences; but the part he took in assisting America against England is a reflection on his political prudence. He died in 1781. His Memoirs, by himself, are curious, but carelessly written; they were printed at Paris in 1792, 2 vols 8vo. *Nouv. Dict. Hist.*

MAUREPAS, in *Geography*, an island on the N.E. coast of lake Superior, in Upper Canada, N.E. of Portchartrain island, about half way between Elbow island and the bay of Michipicoten; 40 miles in circumference. N. lat 47° 42'. W. long. 85° 30'.—Also, an island on the coast of cape Breton, the same as the "Isle Madame;" which see—Also, a lake in West Florida, communicating westward with the Mississippi river, through the gut of Ibberville, and eastward with lake Portchartrain; ten miles long and seven broad.

MAURIAC, a town of France, and chief place of a district, in the department of the Cantal; 18 miles N.N.W. of Aurillac. The place contains 2572, and the canton 11,337 inhabitants, on a territory of 250 kilometres, in 11 communes.

MAURICE, (MAURITIUS), in *Biography*, emperor of the East, was born, about 539, at Arabissus, in Cappadocia. He entered at an early age into the army, and was, on account of his prudence and valour, placed by the emperor Tiberius Constantine at the head of the army sent against the Persian king Hormisdas. He gained two victories over the Persians, and returning to Constantinople, was rewarded with the hand of the emperor's daughter, and the high dignity of Cæsar. At the death of Tiberius, in 582, Maurice succeeded to the throne without opposition. War was renewed with doubtful success, but in the end Hormisdas was deposed, and Chosroes, with the assistance of Maurice, was placed on the Persian throne. Peace was now restored between the two emperors, after which the arms of the emperor were turned against the Avars, a barbarian tribe on the Danube, who had made incursions into Thrace: of these it is said that 60,000 were slain, and a great number taken prisoners. The enemy, however, in the same contest, captured 12,000 of the soldiers in Maurice's army, which they put to death on the refusal of their king to pay a ransom for their lives and liberty. This and other circumstances rendered him extremely unpopular among the troops; and upon the arrival of an order for them to cross the Danube into the enemy's country, they broke out into a general mutiny, and marched back to Constantinople. The populace in that city, partaking

taking in the disaffection, rose in revolt, and assaulted the emperor with stones. He was now glad to make his escape to the Asiatic shore, whence he sent his eldest son to implore the protection and assistance of the Persian king. Phocas, a centurion, had been invested with the purple, and as the emperor quitted the capital he entered it, and was consecrated by the patriarch. Shortly after this he sent his executioners to prevent the possibility of future rivalry. They dragged the unfortunate man from his sanctuary, and having murdered five of his children before his face, slew him in the twentieth year of his reign, A.D. 602. Maurice is highly extolled by ecclesiastical historians for his piety and orthodoxy, and it is generally admitted that he was a virtuous character, possessed of very good intentions, though certainly unequal to his high station. He was well acquainted with the military art, and composed twelve books on the subject, which are still extant. They were published in 1664, at the end of the *Tactics of Arrian*. Univer. Hist. Gibbon.

MAURICE, elector of Saxony, son of Henry the Pious, of the Albertine branch of the Saxon family, was born in 1521. He came to the possession of his territories when he was about twenty years of age, at which time he was distinguished by gracefulness of person, and great dexterity in all martial exercises. He had been educated in a zealous attachment to the Protestant doctrines, yet, when the princes of that persuasion entered into the league of Smalcalde in defence of their civil and religious liberties, he refused to join in it, and attached himself to the party of Charles V. His cousin, John-Frederick, then elector of Saxony, was one of the chiefs of that league; and the unjust design of supplanting him, with the view of making himself the head of the house, was probably the spring of his conduct from his first appearance as a public character. At the diet of Worms, in 1545, he differed from his Protestant brethren, by shewing an inclination to gratify the emperor, in opening a communication with the council of Trent, and granting an aid towards the Turkish war. In the following year, when the Protestant confederacy declared war against Charles, Maurice made a secret treaty with him, by which he engaged to assist him as a faithful subject, stipulating that he should be rewarded with the dignity and territories of which his kinsman, the elector, might be despoiled. He, nevertheless, lulled the suspicions of the other party, till he actually invaded and took possession of almost the whole electorate of Saxony. For this he was branded with the names of traitor and apostate, and became the theme of the bitterest invectives from the pulpit and the press. The elector soon after recovered his dominions, and not contented with this, he seized upon a part of the hereditary possessions of Maurice. His success was short-lived, for in 1547 he lost his sovereignty and his liberty, and his antagonist Maurice was, in the same year, formally invested in the electoral dignity at the diet of Augsberg. He now entered most fully into the emperor's views, and joined him in the project to reduce the whole Germanic body to a state of subjection; nor was it doubtful that the final ruin of Protestantism was a part of his determination. Maurice, sincerely attached to his religion, and feeling his consequence as its head in Germany, resolved henceforth to appear in a character suited to his station and principles. He enforced throughout Saxony "The Interim," or temporary plan of religion, which was to continue till its final settlement, but which was highly obnoxious to the zealous Protestants. In this he was supported by Melancthon and others of the moderate party. He still professed a full adherence to his alliance with the emperor, but as his own plans approached

nearer to execution, he strengthened himself by a treaty with the French king, Henry II, the professed object of which was to restore the landgrave of Hesse to liberty, and to preserve the German constitution. At length, in March 1552, Maurice suddenly joined in Thuringia a considerable army which he had collected, and issued a manifesto containing his reasons for taking arms. The king of France added one in his own name, and both their forces began to act. Maurice now threw off the mask very completely, he advanced into Upper Germany, at every place restoring the magistrates whom the emperor had deposed, and reinstating the Protestants in the churches from which they had been ejected. By hasty marches, attended with great success, he proceeded towards Inspruck, where the emperor then was. A temporary mutiny among his troops gave that powerful monarch time to escape out of the town in a litter by torchlight, before Maurice entered it. He fled across the Alps, having first liberated the former elector of Saxony; the council of Trent broke up in confusion, and the affairs of Germany assumed a totally new face. Negotiations for peace were opened at Passau, where Maurice appeared at the head of the Protestants, and Ferdinand, king of the Romans, represented his brother the emperor. Maurice's demands were supported by the princes of the empire, as well Popish as Protestant, and the emperor found it necessary to enter into terms of accommodation. At length the "Peace of Religion," as it was called, was concluded at Passau, in August 1552, by which the landgrave was to be set at liberty, a diet was to be holden within six months for settling all religious dissensions, and in the mean time each party was to enjoy equal privileges, and the undisturbed exercise of its religion. Thus Maurice, who, by his conduct, had been suspected of apostacy from the Protestant cause, had the glory of establishing the reformation in Germany upon the solid basis on which it has ever since subsisted. After this treaty was agreed on, and signed, he accompanied Ferdinand into Hungary at the head of 20,000 men, in order to take the command of the Turks, but mutinies among the troops and dissensions between the generals prevented him from doing any thing worthy of his reputation. In the following year a confederacy was formed against Albert of Brandenburg, of which Maurice was appointed commander-in-chief, and on the ninth of June, 1553, the two armies met at Sievenhausen, when a fierce engagement ensued, which ended in Albert's total defeat. But the victors had to deplore the loss of many brave officers of distinction, among whom was Maurice himself, who, on leading a body of cavalry to a second charge, was shot in the belly with a pistol-bullet, of which wound he died two days after, in the thirty-second year of his age, and the sixth from his possession of the electoral dignity. Univer. Hist. Robertson.

MAURICE of Nassau, son of William prince of Orange, by his second wife Ann, daughter of the preceding Maurice of Saxony, was about eighteen years of age, and a student in the university of Leyden, at the time of his father's assassination in 1584. Upon that fatal event he was appointed by the states of Holland and Zealand their stadtholder and captain-general, and soon after he took his post as an antagonist of the prince of Parma, the most celebrated general of that age. In 1590 he made himself master of Breda; and in the following year, being created stadtholder of Guelderland, he took several important places, ending with Nimeguen, by which he acquired a very high degree of popularity and fame. In 1593 he captured the strong fortress of Gertruydenberg, which raised him to a parity with the ablest generals of the time, and he appeared to unite with vigour and enterprize of youth all the caution

and vigilance that are usually the result of age and experience. Attempts were made to take away his life, but they were unsuccessful, and he continued for many years in an uninterrupted course of military transactions, and gradually recovered almost all the places within the seven provinces which had been taken by the Spaniards. He gained the memorable battle of Nieuport against the archduke Albert. Several towns fell into his hands in consequence of this success, though he ever after reflected upon himself for putting his country to such a risk as was incurred by this action. After the death of the prince of Parma, Maurice had next Spinola for his antagonist. Every stratagem of war was exhausted in the campaigns between these two masters of the military art, who balanced each other's success. The Spaniards now began to be tired of war, and negotiations were entered upon for a peace, but Maurice threw obstacles in the way of an accommodation, while, on the other hand, the constitutional republicans, at the head of whom was the grand pensioner of Holland, Barneveldt, were on that account the more solicitous to promote it, and in the end they carried their point, and a truce for twelve years was concluded in April, 1609. From this period Maurice appears chiefly in the less respectable light of head of a party, and aiming at a degree of power and influence not at all compatible with a free constitution. Religious disputes succeeded the external tranquility of Holland: these gave Maurice a pretext to interpose with a strong hand, by virtue of his office as stadtholder. The Arminian doctrine was embraced by Barneveldt, Grotius, and many other illustrious characters, who united sentiments of religious liberty with republican politics. These, however, were the smaller number, and Maurice threw all his influence into the scale of their enemies, who would not acquiesce in a proposal for an equal toleration of Calvinists and Arminians: they demanded a national synod to settle their disputes, not doubting that their party would be found to be the majority. To this proposal Maurice lent his assistance, and at length, in 1618, the famous synod of Dordrecht or Dort was assembled. The result of its deliberations was the absolute condemnation of the doctrines of Arminius, and of those who held them. Maurice now exhibited in his own conduct and character the traits of a vile and infamous persecutor, for every man who lifts his arm against the rights of conscience ought, in right, to be held up as infamous: he ordered the apprehension of Barneveldt, Grotius, Hoogenberts, and other heads of that party, who were imprisoned in the castle of Louvenstein. Barneveldt was brought to trial, and though innocent of the charges exhibited against him, was condemned to death by a pusillanimous and iniquitous court, and no intercessions could avert the fate of one whom the prince was so much interested to remove. He died a martyr to his principles, and his death not only fixed an indelible stain on the memory of this prince, but greatly injured his popularity, as soon as the nation became cool enough to estimate the man they had lost. The truce between Spain and Holland expired in 1621, and a renewal of war followed, but Maurice's military transactions were not now remarkable; they were thought to denote the languor of broken spirits and declining health. A conspiracy was formed against his life by the younger son of Barneveldt, joined by some zealous Arminians: it was, however, discovered, and the leaders in it executed. Maurice died at the Hague in 1625, in the fifty-eighth year of his age. He had spent the greater part of his life in the service of his country, of which he was, notwithstanding his defects, considered the preserver, and was unquestionably the greatest statesman and warrior of the period in which he flourished.

Vigilant, indefatigable, penetrating, cautious, and sagacious, he united all the qualities of a general and a hero with the knowledge of a scholar. Ambition, said to be the weakness of a great mind, was his only foible; this rendered him dangerous to that liberty which he had before nobly asserted. There was no part of the science of war with which he was not thoroughly acquainted, but he particularly excelled in the art of fortification, and in the selection of strong posts. He cultivated a taste for the fine arts, and his temper and talents were calculated to support a tottering cause and render it triumphant, and he has been regarded as one of the founders of Batavian independence. Univer. Hist.

MAURICE, or *Morris*, in *Geography*, a river of New Jersey, which runs southerly through Cumberland county, into Delaware bay; navigable for vessels of 100 tons ten miles, and for smaller craft considerably further.

MAURICE Bay, St., a bay on the W. side of cape Farewell island, or south extremity of East Greenland, and the principal harbour of that sea.—Also, a bay on the S. coast of the island of Java. N. lat. 7° 38'. E. long. 109° 3'.

MAURICE Port, a small cove, which has anchorage before it, in 12 fathoms, about half a mile from the shore, over coral rocks, on the E. coast of Terra del Fuego island, on the W. shore of Le Maire straits, between that island and Staten Land, on the E. and N. of the bay of Good Success.

MAURICE, St., a town of Switzerland, in the Vallais, situated between the two chains of mountains that bound this country in their approach towards the Rhone. The town is built almost totally upon the rock, at the foot of steep mountains, and at a small distance from the river. This was anciently called "Agaunum;" and the name of St. Maurice is derived from an abbey erected in the beginning of the sixth century, by Sigismund, king of Burgundy, in honour of a saint who is supposed to have suffered martyrdom in this place: he was, as tradition says, the leader of the famous Theban legion, reported to have been massacred by the order of Maximin, for not renouncing Christianity. A few Roman inscriptions, chiefly sepulchral, and two defaced columns, are the only incontrovertible remains of the antiquity of St. Maurice. It is principally distinguished as being the chief entrance from the canton of Bern into the Vallais. This entrance is formed by a narrow pass, so strongly fortified by nature, that a small number of men might defend it against a considerable army. The stone bridge over the Rhone is much admired for its bold projection; it is of a single arch, and the span is 130 feet. The pass just mentioned is a great thoroughfare for all goods and persons from the lake of Geneva, through the country of Vallais, and over mount St Bernard; 35 miles E. of Geneva. N. lat. 46° 15'. E. long. 6° 52'.—Also, a town of Canada, on a river of the same name; 9 miles N.W. of Trois Rivieres.—Also, a town of France, in the department of Mont Blanc; 11 miles N.N.W. of Chambery, and another in the same department; 24 miles W. of Aosta.—Also, a town of France, in the department of the Orne; 12 miles N.E. of Murtagne.

MAURICE, St., and *St. Lazarus*, an order of knights in Savoy. The order of St. Maurice was instituted in 1440, by Amadeus VII. duke of Savoy, who was afterwards pope, by the name of Felix V. He assigned for its badge a cross pomettée, made either of white taffeta, or of white linen cloth, placed on the knight's breast. In the year 1572 Philibert, duke of Savoy, being made grand-master of the order of St. Lazarus, which, in 1565, had been renewed in Savoy by pope Pius IV., obtained permission from Gregory, then pope,

pope, for the union of the two orders; ever since which time they have been styled the order of St. Maurice and Lazarus. When this union was effected, the badge was a cross pommée argent, upon a cross of eight points vert; being the respective badges of the two orders before they were united, and to be worn pendent to a green ribband.

MAURICEAU, FRANCIS, in *Biography*, a surgeon, eminent in the practice of midwifery, was born at Paris, where he applied, with great industry, to the study and practice of surgery, for many years, especially in the great hospital of that city, the Hôtel-Dieu. He had already acquired there so much experience in the obstetrical department of practice, before he commenced public practice, that he rose almost at once to the head of his profession. His reputation was farther increased by his writings, and maintained by his prudent conduct and acknowledged skill during a series of years; after which he quitted practice entirely, and retired into the country, where he died, in October 1709. He published the following works, all relative to the particular branch of the art which he practised; they contain a great store of useful facts, though ill arranged, and mixed with false reasoning peculiar to his time. 1. "Traité des Maladies des Femmes grosses, et de celles qui sont accouchées," Paris 1688, in 4to. which has been often reprinted, and translated into Latin, as well as into most of the modern European languages. 2. "Aphorismes touchant l'Accouchement, la Grossesse, et les Maladies des Femmes," *ibid.* 1694, which contains a summary of the doctrines of his larger work. 3. "Observations sur la Grossesse et l'Accouchement des Femmes, et sur leurs Maladies, et celles des Enfants nouveaux nés," *ibid.* 1695, 4to. This may be considered as a second volume of the first treatise, and contains a great number of cases and observations, in illustration of the doctrine there stated. 4. "Dernières Observations sur les Maladies des Femmes grosses et accouchées," 4to. *ibid.* 1708; which contains an additional collection of cases. The whole of these works were collected, and reprinted together, after his death, in 1712, and subsequently with figures. *Eloy. Dict. Hist. Gen. Biog.*

MAURIENNE, or MORIENNE, *County of*, in *Geography*, was lately a province of Savoy, consisting of a long narrow valley; it now belongs to France, and is included in the department of Mont Blanc.

MAURIPIDA, one of the Laccadive islands. N. lat. $10^{\circ} 58'$. E. long. $72^{\circ} 21'$.

MAURITANIA, MAURETANIA, or, as it is called by Strabo, *Maurusia*, in *Ancient Geography*, a considerable part of the northern region of Africa, extending from Numidia towards the east to the Atlantic ocean on the west. Mauritania Propria, or Tingitania, considered as unconnected with Mauritania Cæsariensis, was bounded on the E. by the river Malva or Mulucha; on the W. by the Atlantic ocean; on the S. by Gætulia or Libya interior; and on the N. by the Mediterranean. This kingdom, being reduced to the form of a Roman province in the reign of Claudius, was denominated by that prince Mauritania Tingitana; and it was called by the Romans at that time, as well as afterwards, Tingitana, from its principal city Tingi or Tingis, and thus distinguished from Mauritania Cæsariensis. The Tingitania of the ancients very nearly corresponds to the kingdoms of Fez and Morocco. As to the extent of Mauritania properly so called, it may be estimated by considering that the Malva or Mullooiah, its eastern limit, about $1^{\circ} 15'$ W. of London, is rather more than 240 miles distant from the Atlantic ocean. Some modern geographers make the kingdom of Fez to be 270 miles long, and that of Morocco, from cape Non to the mountains which divide it from Segelmessa above 370; but

this computation, with respect to the ancient Tingitania, is, without doubt, more erroneous than that of Pliny, which amounts only to 170 miles.

Mauritania and Maurusia, the names of this country, are derived from the Mauri, an ancient people who inhabited it; and Bochart considers Maurus as equivalent to Mahar; or as an elision of gutturals is very common in the Oriental language, Maur, *i. e.* one from the west, or an occidentality, Mauritania being west of Carthage and Phœnicia. As to the origin and general history of the Mauritians, we may direct our attention to three principal epochs. 1. The period during which the first population, derived from Mizraim by his sons and grandsons, extended from the E. to the W. 2. That in which the Canaanites, expelled from Palestine by Joshua, traversed sea and land to escape from his victorious and destructive arms, established themselves along the coasts of Africa, and partly in the interior of the country. To this purpose Procopius says, that in his time two pillars of stone were to be seen in this country, with the following inscription in the Phœnician language and character upon them: "We are the Canaanites who fled from Joshua, the son of Nun, that notorious robber." 3. The time when the Phœnicians, impelled by the activity of their commercial spirit, formed upon these coasts considerable establishments. We might also mention an influx of Arabians, who came here from Arabia Felix, in the first century of the Christian era, and the invasion of the Mahometan Arabs, in the seventh and eighth centuries. This country, it is well known, bore the name of Barbary, of which there are several derivations. To those that occur under BARBARY, we shall here add, that the name may be formed from the oriental "Bar-Barca," or the sea of Barca, a town of the Pentapolis, called afterwards Ptolemais.

The Mauritians, according to Ptolemy, were divided into several cantons or tribes, which it is needless for us now to enumerate. The metropolis of Tingitania was Tingis or Tingi; which see. Some of its other principal towns were, Zelis, supposed by some to be the modern Arzilla:—Lixus, the residence of Antæus, who was here vanquished by Hercules, and not far from the gardens of the Hesperides; conjectured to be the present Larache:—the city of Hanno, called Thymiatæon:—Sala, near a river of the same name, not far from the Atlantic ocean:—the port and town of Rutubis, 213 miles S. of Lixus:—the Exilissa of Ptolemy, supposed to be the Ceuta of the moderns:—Rufadir, presumed to be Melila or Melilla; and in the interior of the country, the Asecum of Hirtius:—Herpis:—Volubilis, supposed to be the modern Fez:—Gilda, corresponding to Mequinez:—Prisciana:—the Tocolosida of Ptolemy, perhaps the modern Amergue; the Trifidis of Ptolemy:—Gontiana, answering to a small town between Fez and Mequinez, called Gamaa:—Banafa:—Chalee:—Calamintha, &c. &c. Among the rivers of Tingitania we may mention the Malva, Molochath, Mulucha, or Mullooiah; the Thaluda, Taluda, or Tamuda; the Lixus; the Subur; the Sa'a, &c. &c. The chief capes or promontories of Tingitania were, the Metagonitis of Ptolemy, and Metagonium of Strabo; the Sætiarum promontorium of Ptolemy, or the Russadi of the Itinerary; the promontorium Oleastrum; the Phœbi promontorium; the cape Cottes or Ampelusia, now cape Spartel; Mons Solis; promontorium Herulis; and Usadium. Among the principal mountains we may rank Abyla or Abyla or Abenna, called by the ancients one of Hercules's pillars, and by our countrymen Apes hill; the Septem fratres of Mela, or Heptadelphoi of Ptolemy, near Abyla; mount Cotta not far from the Lixus; and mount Atlas. The chief ports of this country were Rufadir, Sinus Emporieus, Cotta,

MAURITANIA.

Cotta, Rutubis, and Mysocaras. The principal islands on the coast of Tingitania were the *Trea Insule* of the Itinerary, N.W. of the *Mulucha*; *Gezira* or *Jezeirah*, in the river *Lixus*, about three leagues from the sea, where the ancients placed the *Hesperides*; *Ptolemy's Porne* and *Erythia*, two obscure islands in the Atlantic; the latter of which is now called *Mogador*; the *Insule Purpuraria*, said by *Hardouin* to be *Madeira* and *Porto Santo*; and the *Insule Beata*, or *Fortunate islands*, of which some reckoned ten, others seven, and others three.

The government of Mauritania, from the earliest ages, is said to have been an absolute monarchy. However *Appian* says, that several tribes of Moors were governed by their own laws, or at least under the direction of their own chiefs and leaders, in opposition to that form of government which was established in the greater part of this country. The independent Arabs, mentioned by *Dr. Shaw* in his *Travels*, who are seated in the kingdom of *Algiers* and *Tunis*, and who sometimes hover about the frontiers of *Morocco*, may probably be the posterity of these free-born Moors. Whether this be allowed or not, most of the provinces of Mauritania, if not the whole country, were subject to one prince in the reign of the elder *Dionysius*. It appears also from *Justin* and *Appian*, that at subsequent periods they had sovereigns, but it is likely that they exercised their sovereign authority according to fixed laws, or certain political maxims, which directed the conduct of their rulers.

As to their religion, *Neptune* was one of the principal objects of their adoration. They likewise paid religious honours to the sun and moon, in common with the other *Libyan* nations. *Seneca* asserts that they offered human sacrifices to their gods, in imitation of the *Phœnicians* and *Carthaginians*, or some other ancient people, from whom they derived their origin. *Bacchus* was also worshipped by the Mauritians; and, in short, we may form a notion of their religion from that of the *Egyptians*, *Phœnicians*, *Persians*, and *Carthaginians*. Their language and character scarcely differed from those of the *Numidians*. As to their customs and habits, they at first used only clubs in their military conflicts, till they were taught the use of the sword. All persons of distinction were clad in rich apparel, ornamented with gold and silver, and they took great pains in curling their hair, curiously and elegantly, cleansing their teeth, combing their beards, which were long, and paring their nails. In time of action the Mauritanian infantry used shields made of elephants' skins, and they were clad, both night and day, in those of lions, leopards, and bears. The cavalry were armed with broad short lances, and carried targets or bucklers, made of the skins of wild beasts. They used no saddles. Their horses were small and swift, and so much under command, that they would follow them like dogs. *Herodotus* intimates, that the shield and helmet came from them to the *Greeks*. Notwithstanding the fertility of their soil, the poorer Mauritians never attended to agriculture, but roved about the country in a wild savage manner, like the ancient *Scythians* or *Arabian Scenites*. They lived in small and inconvenient tents; their food was corn and herbage, which they frequently ate green, and without any preparation; their habit was the same in summer and winter, and consisted of a tattered, though thick, garment, covered with a coarse rough tunic; they reposed on the ground, sometimes spreading their garments under them, as the *African Kabyles* and *Arabs* now do. According to a passage in *Horace*, they shot poisoned arrows; in preparing and using which they were skilful, having acquired the art from self-defence against the wild beasts, to which they were ex-

posed. With regard to the arts and sciences, the Mauritians were rude and barbarous; but if they excelled in any art, it must have been in navigation. 'Tis magic, sorcery, and divination, they were much addicted. *Strabo* differs from *Mela* in his description of *Tingitania*; for he represents it, not as poor and despicable, but as an opulent kingdom.

The history of the Mauritians presents to our notice nothing remarkable, except the defeat of *Antæus*, till the Roman times. *Sallust* informs us that nothing of the Mauri, except their name, was known to the Romans so late as the *Jugurthine* war; and the most ancient Greek writers considered them merely as a branch of the *Libyans*. *Bogud*, king of Mauritania, who was contemporary with *Julius Cæsar*, contributed very much to his great success in Africa, and he assisted him also in Spain. After *Cæsar's* death, he joined *Antony* against *Octavius*, but when he attempted to make a diversion in Spain, in favour of the former, the *Tingitians* revolted, and being supported by *Bocchus's* troops in the interest of *Octavius*, *Bocchus* succeeded and was put in possession of *Tingitania*, and *Octavius* granted to the inhabitants of *Tingis* the privileges of Roman citizens. After *Bocchus's* death, *Tingitania* was reduced to the form of a Roman province. *Augustus* gave the younger *Juba* the two *Mauritanias*, together with part of *Gætulia*, some time after his marriage with the younger *Cleopatra*, instead of his father's kingdom, *i. e.* *Numidia*, which still remained a Roman province. The Mauritians, however, did not quietly submit to the Roman yoke. At the commencement of the reign of *Tiberius*, *Tarfarius*, a Numidian soldier, enterprising and courageous, famed among the Romans in the art of war, entered into a confederacy with some discontented Moors, and refused to acknowledge the authority of Rome. *Tarfarius* was defeated by the proconsul *Cornelius Dolabella*. In this war *Ptolemy*, the son of *Juba II.* and grandson of *Juba I.* rendered very considerable assistance to the Romans. However, he was put to death under *Caligula*. *Eudemon*, his freedman, raised an army in order to avenge his death. *Claudius*, who succeeded *Caligula*, sent an army against the Moors, and they were completely defeated.

In consequence of a treaty of peace between the two commanders, Mauritania was delivered entirely into the hands of the Romans; for we find it soon after divided into two provinces, the one called *Tingitania*, or *Mauritania Tingitana*, from the city *Tingis*, and the other *Mauritania Cæsariensis*, from *Cæsar*, a surname which *Claudius* had in common with the other Roman emperors.

The Mauritians, being completely subjected to the Romans, returned to their customary occupations, and having abandoned a military life, devoted themselves to the care of their lands, herds, and flocks. But the dissensions that occurred on occasion of the pretensions of *Otho* and *Vitellius* to the empire, put them again in motion. Under the immediately succeeding reigns nothing very material occurred; but under the empire of *Diocletian*, they engaged in a contest with *Maximin*, his associate in the empire. In this conflict they were great sufferers; being obliged to deliver up their arms and to abandon their country. After the abdication of *Diocletian*, they were involved in new troubles. The troops of Africa revolted and proclaimed *Alexander* their lieutenant; upon which they were attacked and defeated by *Maxentius*.

Constantine, after his accession, granted singular privileges to the African churches, which soon became very numerous. But when the seat of government was transferred to *Byzantium* by *Constantine*, the distant provinces were abandoned to the

oppression of their governors. The Mauritians suffered, and their country was once and again the scene of tumult and of war. When the Vandals were destroyed in Africa under the reign of Justinian, by the activity of Belisarius, the Mauritians found themselves exposed to the tyranny and oppression of Greek prefects. The people revolted; and at length, under the empire of Heraclius, the caliphs having conquered Egypt and Syria, sent an army on their coast. The whole country, as far as the columns of Hercules, submitted to their domination, under which it has more or less continued. See MOORS.

MAURITANIA *Cæsariensis*, or *Cæsariana*, a part of Mauritania so denominated under the reign of Claudius. This province had been separated from Numidia: it extended from Mauritania Tingitana, from which it was separated by the river Malva on the west as far as the Ampsagee. See NUMIDIA.

MAURITANIA *Sitifensis*, a part of Mauritania *Cæsariensis* on the eastern side, adjacent to Numidia, so called from Sitifi, a town in that territory.

MAURITIA, in *Botany*, a Palm so named by the younger Linnæus, after the appellation by which it is known to the Dutch settlers in Surinam, *Mauritii-Boom*, or Maurice tree. Whether this appellation originated in any compliment to the memory of their great prince Maurice, or of any other person of the same name, or whether the tree were thought to have been brought from the island of Mauritius, we are not informed.—Linn. Suppl. 70. Schreb. 779. Mart. Mill. Dict. v. 3. Juss. 40. Lamarck Dict. v. 3. 739.—Class and order, *Dioecia? Hexandria*. Nat. Ord. *Palme*.

Gen. Ch. Male an oblong sessile *catkin*, covered entirely with closely crowded flowers, having obtuse scales between them. *Cal.* Perianth of one leaf; cup-shaped, abrupt, entire, triangular, short. *Cor.* of one petal; tube short, the length of the calyx, with three sutures, by which the divisions of the limb are easily continued down to the base; limb in three deep, equal, slightly spreading, lanceolate, obtuse, channelled, rigid, and almost woody, segments. *Stam.* Filaments six, thick and very short, inserted into the mouth of the tube; anthers linear, angular, the length of the corolla, three of them spreading horizontally between its segments, the alternate three erect, closely pressed to the channel of each segment.

Female unknown.

Eff. Ch. Male an oblong sessile *catkin*. Calyx of one leaf, cup-shaped, undivided. Corolla of one petal, with a short tube, and three-cleft limb.

1. *M. flexuosa*. Linn. Suppl. 454. Syst. Veg. ed. 14. 986.—Sent, from the woods of Surinam, by Dalberg, being a part of the botanical collection, preserved in spirits of wine, which king Gustavus III. of Sweden presented to Linnæus. (See GUSTAVIA.) It is described as a nearly leafless tree, with angular, zigzag, smooth branches, composed of short joints swelling upwards and somewhat recurved, each joint terminating in a cup-like, doubly-pointed sheath. From these sheaths, over the whole stem, spring solitary sessile *catkins*, of an ovate-oblong cylindrical figure, rather above an inch in length, widely spreading in two ranks, each having at its base a pair of larger erect falcate scales. The flowers are of a rusty hue, at least in the preserved specimens, and closely cover the whole *catkin*, standing at a right angle with its common stalk. The scales which separate the flowers are round and obtuse, smaller than the pair at the bottom of the *catkin*. The flowers fall when faded, leaving the *catkin* and its scales permanent. Linnæus

justly speaks of this tree as very singular, being almost destitute of foliage, and laments that he knew nothing of the female flowers or fruit. These are presumed to be borne on a distinct individual.

MAURITIA, in *Gardening*, comprehends a plant of the exotic tree kind, of which the species cultivated is the maidenhair tree, or ginkgo, (*M. flexuosa*.)

Method of Culture.—It may be increased by laying down the young branches in the summer season, and when they have stricken root fully, taking them off and planting them with earth about their roots in pots filled with light fresh mould, placing them in the greenhouse, where they must be kept.

And the cuttings of the young shoots may also be planted in pots in the same manner, plunging them in a moderate hot-bed till they have stricken root, when they may be managed as the other plants are directed to be.

This plant affords variety in the greenhouse, and when trained against walls; but in the last case must be sheltered by mats, in severe weather in the winter season.

MAURITIO, ST., in *Geography*, a town of France, in the department of the Po; seven miles N.N.W. of Turin.

MAURITIUS, or *Isle of France*, an island in the Indian sea, first discovered by the Dutch in 1598, and so called by them in honour of the prince of Orange. On their first arrival the Dutch anchored with a fleet of five ships in a safe port capable of containing 50 large vessels, and which, in honour of their vice-admiral, they called Warwick's Haven. The country was found to abound with cattle, fowl, fish, and fruits; and afforded a seasonable supply of necessaries to the crew and of refreshments to the sick, who went on shore for their recovery. Of the importance of this island they were sufficiently apprised, inasmuch that they recorded in their journals an observation, that it might be commodiously visited by outward bound ships, as that of St. Helena might be on their return: nevertheless, they made no settlement in this island for forty years, and they were just in time to preclude the French from taking possession of it. They had the precaution to build a fort for the defence of the haven and watering place; and in 1640 they had two or three small settlements in the island, besides their fort. But as they wanted slaves to cultivate their plantations, they applied to the French governor of Madagascar, and prevailed upon him to steal 50 blacks out of the number of those who were under his protection. This fraudulent act induced the people of Madagascar to withdraw their confidence from the French; and as to the negroes that were carried to Mauritius, many of them fled into the woods and mountains, where they became robbers or banditti, or, as they are denominated in the West Indies, maroons. These were joined by other persons of a similar description, and became so powerful, that the Dutch, notwithstanding their garrison of 50 men in the fort, could not secure themselves against their insults and depredations. About the beginning of the last century, the Dutch East India company in Holland determined to abandon it; and actually withdrew their colony from it in 1712, and removed it to the Cape of Good Hope. The island, says the Abbé Raynal, was uninhabited when the French landed there in 1720, and changed its name from Mauritius to the Isle of France, which name it still bears. Its first inhabitants, he says, came over from the Isle of Bourbon; but it remained in a neglected state for almost fifteen years. At length, in 1734, the French company resolved to make some important settlement here, and the project was entrusted to the execution of Mahe de la Bourdonnais. As soon as he arrived he was

indefatigably active in executing every plan for the improvement of the island, which his sagacity devised: and to him the French were afterwards indebted for aqueducts, bridges, hospitals, and storehouses. Exciting by his example a spirit of emulation and industry in the colonists, he changed the whole aspect of the island and the condition of its inhabitants, during the twelve years of his administration. By his recommendation the French made choice of the harbour to the N.W. of this island, in preference to that which is more spacious and more commodious to the S.E.; a harbour to the leeward possessing many advantages in latitudes where the general winds prevail. The spirit which he excited led the inhabitants to the cultivation of corn, which became the most prosperous of all the branches of agriculture practised at this island; where the fields yield annually in regular succession a crop of wheat and another of maize or Indian corn. The manioc or cassava, which was brought from Brazil by M. la Bourdonnais, served as common food to the blacks. In consequence of the improvements of this governor, ships going to India found all the refreshments and conveniences they wanted after a tedious passage. The continual supplies afforded to ships and squadrons have contributed to check the increase of cattle, which it was the object of La Bourdonnais to multiply. However, the island produces excellent pasture, which springs up in the beginning of the rainy season. It completes the whole course of its vegetation in the course of three months, during which interval the inhabitants feed their herds. This island has occasionally suffered much from hurricanes, so that the colony has been preserved by the attention of the governor in procuring supplies from the Cape of Good Hope. The cultivation of corn in this island has been much promoted by M. Poivre; and in a variety of other ways, particularly by introducing the nutmeg and clove, and the rice of Cochinchina, he contributed to enrich the colony entrusted to his care. M. Cerè procured from Ceylon, and planted in this island, of which he was governor, a great number of cinnamon, clove, and nutmeg trees, which have been very prosperous. But in 1786, the Dutch, actuated by the true spirit of monopoly, sent a vagabond to the island in order to destroy these plantations; but the plot was discovered in time, and the vagabond escaped merited punishment.

The soil of this island is, generally speaking, red and stony; towards the sea-coasts it is mountainous, but within land there are many spots both level and fertile. Some of the mountains are high, but none exceed 426 fathoms in elevation: it is said, however, that their summits are covered with snow throughout the year. The whole island is well watered; and it produces all the trees, fruits, and herbs, which grow in this part of the globe, in great plenty; groves of oranges as well as citrons; and the pine-apple grows spontaneously in great perfection. The chief produce is sugar. When this island was first discovered, the ground was covered with wood up to the summits of the mountains, so that it was one immense forest full of beautiful trees. M. Rochon observed in it different kinds of the palm-tree, bamboos, ebony, mat-wood, tacamaca, stinking wood, and many other kinds of valuable trees. No venomous animals, except scorpions and millepedes, are known here. For fineness of climate, and salubrity of air, this island, as well as that of Bourbon, may be compared with the Fortunate islands. The whole extent of the island is about 150 miles, and its form is nearly circular. The population, in the year 1790, exclusive of the military, was estimated at 8000 whites and 12,000 blacks. This island,

the last remains of the French possessions in the Indian seas, was taken by the English, December 2, 1810. S. lat. 20° 12'. E. long. 58° 27'.

MAURO, *ST.*, a town of Naples, in Lavoro; 4 miles S.E. of Capua.—Also, a town of Naples, in Basilicata; 22 miles S.E. of Acerenza.—Also, a town of the county of Tyrol; 12 miles N.N.E. of Trent.—Also, a town of Naples, in Calabria Citra; 3 miles W.S.W. of Rossano.

MAUROCENIA, in *Botany*, Linn. Hort. Cliff. 103. Gen. ed. t. 85, was named by Linnæus in honour of Giovanni Francesco Mauroceno, a Venetian senator, who had a very fine and rich garden at Padua, of which a catalogue was published there by Antonio Tita in 1713, being an 8vo. of 183 pages, besides 13 pages describing a journey of the author's over the mountains of Trent. This genus was subsequently sunk in *Cassine*, the only species of which it consisted being *Cassine Maurocena*, Linn. Sp. Pl. 385. See *CASSINE*.

MAUROLICO, or MAUROLICUS, FRANCIS, in *Biography*, who flourished in the sixteenth century, descended from a noble Greek family, (but driven to seek an asylum in Sicily from the persecution of the Turks,) was born at Messina in the year 1494. He was, at a very early period, distinguished by his proficiency in polite literature, the learned languages, and, above all, in mathematical learning. He devoted himself to theology as a profession; but his favourite studies were those of the belles lettres, and the sciences properly so called. For a considerable time he was professor of mathematics in his native city, and was much followed and admired on account of the great perspicuity with which he explained and illustrated the most difficult questions. His fame, as a mathematician, extended over the whole of Europe. He excelled in geometry, astronomy, optics, and architecture; and he enjoyed the esteem and friendship of the most illustrious persons of his time. He was by his countrymen regarded as their second Archimedes. He restored the fifth book of Apollonius, which had been lost; and he discovered a new method of demonstrating the properties of the conic sections, in which he has been followed by many modern geometers. He made discoveries in the art of dialling, of which he published an account in his "De Lineis Horariis." He wrote on optics, and is mentioned by Dr. Priestley and others as the person who discovered that it is the crystalline humour which collects and unites on the retina the rays which it receives from external objects, and brings every pencil to its proper focus; and by means of it, he was able to explain the phenomena of long and short-sightedness, which had been till then inexplicable. He is said also to have given the first solution of the problem concerning the image of the sun appearing round, though the rays that form it are transmitted into a dark room through an angular aperture. He died at the advanced age of eighty, leaving behind him numerous works, that attest to the greatness of his talents, and his unceasing industry and perseverance, though he was for many years an invalid. His biographers have given the titles of the following as his principal works: "The Spherics of Theodosius;" "Eminentio et Restitutio Conicorum Apollonii Pergæi;" "Archimedis Monumenta omnia;" "Euclidis Phænomena;" "Opuscula Mathematica;" "Arithmeticonum Libri duo;" "Photismus de Lumine et Umbra;" "Problemata Mechanica ad Magnetem et ad Pyxidem nauticam Pertinentia." Priestley's Light and Colours. Moreri.

MAURON, in *Geography*, a town of France, in the department of the Morbihan, and chief place of a canton, in the district of Ploermel; 10 miles N. of Ploermel. The

place contains 4212, and the canton 9035 inhabitants, on a territory of 192½ kilometres, in 7 communes.

MAUROUSE, the name of a creature of the deer kind, mentioned by Josselyn. It seems to be the same with the *dama Virginiana* of Mr. Ray, one of which creatures was, in his time, kept alive in St. James's park.

This is not certain, however; for Josselyn's description is very imperfect: he only says it is like the moose-deer, but is small, and has small horns.

MAURS, in *Geography*, a town of France, in the department of the Cantal, and chief place of a canton, in the district of Aurillac; 18 miles S.S.W. of Aurillac. The place contains 2045, and the canton 11,029 inhabitants, on a territory of 262½ kilometres, in 13 communes.

MAURSEE, a considerable lake of Prussia, in the province of Culm; 10 miles E. of Rastenburg.

MAURUA, or MAUROGA, one of the Society islands, in the South Pacific ocean, of small size, wholly surrounded by a reef, and destitute of harbour for shipping. It is inhabited, and bears the same produce as the neighbouring islands. Its middle rises in a high round hill, that may be seen at the distance of 10 leagues. S. lat. 16° 26'. W. long. 152°.

MAURUCA, a kingdom on the east coast of Africa, situated in about S. lat. 14° 30'. E. long. 37° 14'.

MAUSAHEID, or MESEK, a town of Arabia; 35 miles N. of Mocha.

MAU-SIDS, a town of Arabia, in the province of Yemen; 24 miles N. of Mocha.

MAUSOLEUM, a magnificent tomb, or funeral monument, decorated with architecture and sculpture, and inscribed with an epitaph; erected in honour of some emperor, prince, or other illustrious person.

The word comes from *Mausolus*, the name of a king of Caria, to whom Artemisia, his widow, erected a most stately monument, that has since been numbered among the seven wonders of the world; calling it, from his name, Mausoleum. It was sixty-three feet long, almost four hundred and eleven feet in compass, and about thirty-five feet high, surrounded with thirty-six columns, that were beautified in a wonderful manner. Pliny has described it, lib. xxxvi. cap. 5. Afterwards the same name was given to all costly monuments. Thus the stately monument was called, which Augustus built, during his sixth consulship, between the Flaminia Via and the Tiber, to be a burial-place for him and his family, and which Strabo has described in his fifth book. It is also the name which Florus, lib. iv. cap. 11. gives to the monuments of the kings of Egypt, wherein Cleopatra shut herself up, and put herself to death. Many authorities testify, that the Romans gave this name to those sepulchres whose structure was magnificent.

MAUSOLEUM is also used to signify the decoration of a fictitious tomb, or catafalca, in funeral pomp.

MAUSSAC, PHILIP-JAMES, in *Biography*, a learned critic, was born at Toulouse in the year 1590, where his father was a counsellor of parliament. He was educated for the profession of the law, and became president of the court of aides at Montpellier, where he died in 1650. He was accounted one of the best Greek scholars of his time. He wrote "Notes and Corrections on Harpocration," "Remarks on the Treatise on Mountains and Rivers ascribed to Plutarch," and various other works. Moreri.

MAUTCHONG-COUNSAN, in *Geography*, a mountain of Thibet. N. lat. 31° 38'. E. long. 83° 44'.

MAUTEN, a town of Carinthia, at the conflux of the Moledin and the Geil; 18 miles S.W. of Saxenburg.

MAUTERN, a town of the duchy of Stiria; 8 miles N. of Windisch Gratz.

MAUTH, a town of Bohemia, in the circle of Beraun; 18 miles S.E. of Beraun.

MAUTHAUSEN, a town of Austria, on the left bank of the Danube; 7 miles E. of Steyregg.

MAUTOUR, PHILIBERT BERNARD MOREAU DE, in *Biography*, auditor of the chamber of accounts at Paris, and member of the academy of inscriptions. He was born at Beaune in 1654, and died in 1737. He wrote some papers in the Memoirs of the Academy of Belles Lettres, and poems. He was also the editor of an abridgment of Petavius's Chronology, 4 vols. 12mo. Moreri.

MAUTERN, in *Geography*, a town of Austria, on the south side of the Danube, opposite to Stein; 32 miles W.N.W. of Vienna. N. lat. 48° 23'. E. long. 15° 38'.

MAUTERN DORF, a town of the principality of Salzburg; 11 miles S. of Radstadt.

MAUVEZIN, a town of France, in the department of the Gers, and chief place of a canton, in the district of Lectoure; 17 miles S.S.E. of Lectoure. The place contains 2005, and the canton 9083 inhabitants, on a territory of 192½ kilometres, in 26 communes.

MAUVILLON, JAMES, in *Biography*, professor of the military sciences in the Caroline college at Brunswick, was descended from a French family, and born at Leipzig in 1743. His father being professor of the French language in the Caroline college, he had an opportunity of prosecuting his studies under the celebrated men who, at that time, were an ornament to the sciences which they taught. The favourite pursuits of the son were the languages, drawing, and mathematics. He soon displayed a strong attachment to a military life; but as this was opposed by his father, who wished him to study the law, he went privately and offered to enlist himself with general Wallmoden. Though his ardour was great, his stature was so small and diminutive, that the general refused to admit him into the service. At length, however, he was received into the corps of engineers; but, at the conclusion of the war, he was, at the persuasion of his father, induced to repair to Leipzig to study the law. His mind was not at all formed for legal studies, and he preferred to these the drudgery of assisting in a school. Here he improved himself in the Latin language, and soon after, on the recommendation of the general, was appointed engineer of bridges and highways at Cassel, and teacher of the military sciences. About this period he became a contributor to some periodical works, and wrote his "Letters on the Merits of the German Poets," which, on account of the severity of his animadversions, excited against him many enemies. In 1775 he gave proofs of his diligence, as well as his talents, by translating Raynal's "History of the Indies," a work of Turgot's, and Ariosto; besides being engaged in several journals. In 1777 he was appointed captain of a corps of cadets, and obtained the friendship of professor Dohm, afterwards the Prussian minister. To this person he addressed his "Physiocratic Letters," which were published in 1780; and in the same year he was elected a member of the Society of Antiquaries at Cassel, and wrote several papers, which were inserted in its transactions. In 1781 he published his "Introduction to the Military Sciences," with an Essay on the thirty years' war, and another on the influence which the invention of gunpowder has had in modern wars. These were all published in the French language. His situation in the corps of cadets subjected him to much uneasiness; and about this time he repaired to Potsdam, and solicited

solicited an appointment from Frederic II., which would have been readily granted; but he found his wife so averse from settling in Prussia, that he gave up the idea, and returned to his former situation at Cassel. He studied religion as well as military tactics, and in 1787 published what he entitled a "System of Religion." He had, previously to this, formed an acquaintance, which ripened into friendship, with the celebrated Mirabeau. An account of the joint pursuits of these friends may be found in Mirabeau's "Lettres du Comte de Mirabeau à un de ses Amis en Allemagne, écrites durant les Années 1786-90." Mauvillon died in 1792. The last work which he published was entitled "Man and Woman," written in opposition to a book by Brandes, in which the female sex had not been treated with that degree of justice which Mauvillon thought due to them. He began a "Life of Prince Ferdinand of Brunswick," which is said to be the best of all his productions. Mauvillon was fond of company; and in the early part of life, the whole object of his labour was that he might gratify his taste without running into debt. In his manners and dress he was exceedingly simple; he had no attachment to wine, but was excessively fond of coffee; he was a zealous advocate for the principles of toleration, and in all kinds of company avowed his sentiments with the greatest freedom. He was friendly to the French revolution, but disapproved of the horrid scenes which attended it. Gen. Biog.

MAUZAT, in *Geography*, a town of France, in the department of the Puy-de-Dôme, and chief place of a canton, in the district of Riom. The place contains 1565, and the canton 9072 inhabitants, on a territory of 242½ kilometres, in 10 communes.

MAUZE', a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Niort. The place contains 1600, and the canton 6876 inhabitants, on a territory of 145 kilometres, in 8 communes.

MAW, a sea-port of Ceylon, at the mouth of a river on the west coast; 50 miles W. of Candy. N. lat. 7° 45'. E. long. 75 55'.

MAW. See ABOMASUS.

MAW-Skin, in *Rural Economy*, a provincial word used to signify the stomach of the calf prepared for cheese-making.

MAWAR-UL-NERE, denoting "the country beyond the river, or "Transoxiana," in *Geography*, a country of Independent Tartary, lying beyond the Oxus, or modern Gihon or Jihon; and beyond the lower parts of the courses of that river, and the Sihon, or ancient Iaxartes.

MAWHELLIPOUR, a town of Hindoostan, in Bahar; 3 miles S.W. of Bahar. N. lat. 25° 21'. E. long. 84° 55'.

MAWRI, a sea-port town of Africa, in the country of Sabu, on the Gold coast, inhabited chiefly by fishermen. In the middle of the town is Fort Nassau, built by the Dutch, with a small garrison.

MAWS, Sr., a borough town in the parish of St. Just, hundred of Powder, and county of Cornwall, England, is situated on the east side of Falmouth harbour; one mile distant from Falmouth, and 270 from London. It consists only of one street, containing about twenty houses, inhabited chiefly by fishermen. A fair is held annually, but the town has never been incorporated, and has neither church, chapel, nor meeting-house; yet it sends two representatives to parliament, and has done so ever since the fourth year of queen Elizabeth. It is governed by a portreeve, who has the title of mayor. The principal influence and property of the borough are now possessed by the marquis

of Buckingham. King Henry VIII. erected a castle here, opposite to that of Pendennis, to which it is very inferior both in size and situation, though built nearly at the same time, by the same monarch, and for the same purpose, *i. e.* the security of Falmouth harbour. The works are completely commanded by a hill, which rises immediately behind them. Beauties of England and Wales, vol. ii.

MAXANTELLA, an island near the port of Matanchel, on the west coast of New Mexico, in the North Pacific ocean.

MAXDORF, a town of Bohemia, in the circle of Leitmeritz; 10 miles W. of Kamnitz.

MAXEN, a town of Saxony, famous for a victory obtained by the Austrians, commanded by count Daun, over the Prussians, in 1759, when 20,000 Prussians laid down their arms and surrendered prisoners of war; 80 miles S. of Dresden.

MAXENTIUS, MARCUS AURELIUS VALENIUS, in *Biography*, a Roman emperor, was the son of Maximian, and married the daughter of Galerius. The abdication of Maximian and Dioclesian, in 305, made room for the elevation of Galerius and Constantius to the rank of Augustus; of course, two new Cæsars were to be appointed; but Maxentius, on account of his vicious propensities, was passed over, though, from his birth and rank in the state, he seemed best entitled to that honour. Deprived of what he thought his natural right, he waited only for an opportunity of asserting his claims; and in 306 he declared himself independent emperor, and, without remorse or compunction, put to death the prefect, and other magistrates who adhered to Galerius. His abdicated father, by this time, weary of retirement, resuming his dignity, joined him; and Severus, the newly-made Cæsar, who marched against them, finding himself deserted by his army, surrendered himself prisoner to the victorious emperors. He was at first received with great humanity, and treated with a respect due to his rank. Maximian himself conducted the captive emperor to Rome, and gave him the most solemn assurances that he had secured his life and happiness, by the resignation of the purple. But, in spite of the honour of an emperor, Severus could only obtain an easy death, and an imperial funeral. In February 307, the sentence was signified to him, but the manner of executing it was left to his own choice. He preferred the favourite mode of the ancients, that of opening his veins; and as soon as he expired, his body was carried to the sepulchre which had been constructed for the family of Gallienus. Galerius, at this time, entered Italy with a powerful army, for the purpose of dethroning Maxentius; but he found the new emperor so strongly defended, and his own troops so wavering in their fidelity, that he thought it best to consult his safety by a retreat. Maximian also became his rival, and attempted to depose him; but the soldiers decided in favour of the younger claimant, and Maximian, who aimed at all, lost all, and was obliged to retire with shame and humiliation. Maxentius was now the undisputed master of Italy. He passed into Africa, where he rendered himself odious by his cruelty and oppressions. His suspicions frequently endangered the lives of persons of rank; and the honour and chastity of their wives and daughters were daily exposed to violation from his brutal desires. The heroic conduct of a Christian lady, who plunged a dagger into her breast, in order that she might escape his impure embraces, has been recorded by some writers to her honour, though others have questioned the lawfulness of the act; but none have hesitated to hold up the conduct of the tyrant to that contempt and infamy which it so justly merited. Upon the return of Maxentius

Maxentius to Rome, he was informed that Constantine was come to dethrone him. The resources of Maxentius, both in men and money, were still considerable. The Prætorian guards felt how strongly their own interest and safety were connected with his cause, and an army was speedily collected. It was far from the intention of the emperor to lead his troops in person. "A stranger," says the historian, "to the exercises of war, he trembled at the apprehension of so dangerous a contest; and as fear is commonly superstitious, he listened with melancholy attention to the rumours of omens and presages, which seemed to menace his life and empire. Shame at length supplied the place of courage, and forced him to take the field, being unable to sustain the contempt of the Roman people. The circus resounded with their indignant clamours, and they tumultuously besieged the gates of the palace, reproaching the pusillanimity of their indolent sovereign, and celebrating the heroic spirit of Constantine. Before Maxentius left Rome, he consulted the Sibylline books. The guardians of those sacred oracles were as well versed in the arts of this world, as they were ignorant of the secrets of fate; and they returned him a very prudent answer, which might adapt itself to the event, and secure their reputation, whatever should be the chance of arms." At length he assembled his forces, and gave his enemy battle; but lost the day, and fled with the utmost precipitation to the city. The bridge, over which he was to cross the Tiber, was in a decayed situation, and he fell into the river, and was drowned. This happened on the 24th of September, A.D. 312. The cowardice and luxuries of Maxentius were as conspicuous as his cruelties. He oppressed his subjects with heavy taxes, to gratify the cravings of his pleasure, or the avarice of his favourites; and he was so debauched in his manners, that neither virtue nor innocence was safe, if within his reach. He was naturally deformed, of an unwieldy body, and the smallest exertions to him were as Herculean labours. Gibbon, vol. ii. 8vo. Univer. Hist.

MAXILLA, in *Anatomy*, the jaw. The term is usually applied to the bones. The maxilla superior contains six pairs of bones, and one single bone; the maxilla inferior is a single bone. See **CRANIUM**.

MAXILLA, *Fractions and Dislocations of*, in *Surgery*. See **FRACTURE** and **LUXATION**.

MAXILLARIS, **MAXILLARY**, in *Anatomy*, an epithet applied to various parts about the jaws. There is an external, an internal, and an inferior maxillary artery (see **ARTERY**); one inferior and two superior maxillary bones (see **CRANIUM**); a maxillary gland, which is a mucous gland of the cheek, placed near the back upper teeth; a superior and inferior maxillary nerve, branches of the fifth pair (see **NERVE**); a maxillary sinus or antrum maxillare, which is a large hollow of the superior maxillary bone. See **CRANIUM** and **NOSE**.

MAXILLARY SINUS, *Abscess of*, in *Surgery*. See **ABSCESS**.

MAXILLARY SINUS, *Fungus of*. See **FUNGUS**.

MAXIM denotes an established proposition or principle; in which sense it amounts to much the same with axiom.

Maxims are a kind of propositions, which have passed for principles of science; and which, being self-evident, have been by some supposed innate.

A maxim in law is said to be a proposition, of all men confessed and granted without argument or discourse.

Maxims of the law are holden for law; and all other cases that may be applied to them, shall be taken for granted. (1 Inst. 11. 67. 4 Rep.) The maxims in our law-books,

which are many and various, are such as the following, viz. It is a maxim, that land shall descend from the father to the son, &c. That if a man have two sons, by divers venters, and the one purchase lands and die without issue, the other shall never be his heir, &c. That as no estate can be vested in the king, without matter of record, so none can be divested out of him but by matter of record. That an obligation, or matter in writing, cannot be dissolved by an agreement by word, without writing. Co. Litt. 11. 141. See **LAW**.

MAXIMA CÆSARIENSIS, in *Ancient Geography*, one of the five provinces into which Britain was divided by the Romans; but the reason of the name, and the time when this province was erected, are not certainly known. It was bounded on the south by the Humber, on the east by the German ocean, on the west by the Irish sea, and on the north by the wall of Severus; and contained the countries of the Parisi and the Brigantes, which are now the counties of York, Durham, Lancaster, Cumberland, and Northumberland. For the other four provinces, see **FLAVIA Cæsariensis** and **VALENTIA**.

MAXIMA, *Lat., Maxime, Fr.* See **MASSIMA** and **TIME-Table**.

MAXIMA et Minima, in *Analysis and Geometry*, are the greatest and least values of a variable quantity; and the method of finding these greatest and least values is called the *method de maximis et minimis*, which forms one of the most interesting inquiries in the modern analysis. This subject was considered geometrically by some of the most ancient mathematicians, particularly by Apollonius, in the fifth book of his Conics; and there are still a few problems of this kind, which succeed better by the geometrical than by the analytical method: their number, however, is very limited, compared with those which may be elegantly performed by analysis. To the latter, therefore, we shall principally direct our attention, only shewing, in a few cases, how the same may be accomplished by means of the pure elements of geometry.

The method de maximis et minimis, according to the analytical doctrine, first arose at the beginning of the seventeenth century, after the invention of Descartes for expressing the properties of curve lines by means of algebraical equations, and classing them into different orders, according to the degree of the equation which expressed the relation between the absciss and ordinate. Besides the method of Descartes, we have also those of Fermat, Hudde, Huygens, Sluse, and some others, which are now all supplanted by the general and elegant method of fluxions; yet as these several methods may be considered as so many steps towards the discovery of the latter, it will be interesting to have a brief abstract of them, in order to shew how slow and progressive are the steps to knowledge, and by what imperceptible degrees we arrive towards perfection.

Fermat's Method de Maximis et Minimis.—The principle upon which Fermat formed his operation consisted in this: that when the ordinate of a curve was the greatest possible, if we augmented the variable quantity x , which represents the absciss, by an indefinitely small quantity e , the ordinate corresponding to this absciss will be equal to the former, or will approach towards equality indefinitely near; or, which is the same, the increase or decrease of an ordinate, when it approaches indefinitely near its maximum or minimum, is nothing; and, therefore, these two ordinates may be considered as equal, whence an equation is obtained, from which cancelling the like quantities, and all those powers of e beyond the first, because they are indefinitely small with regard to the others, and dividing the other terms by e , the value

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value of x will be obtained, that renders the function a maximum or a minimum.

For example: let it be proposed to find that value of x , in the equation $y^3 = 2ax - x^3$, which renders y a maximum.

Increase the variable quantity by e ; then,

$$y = 2a(x + e) - (x + e)^3,$$

$$\text{or, } 2ax - x^3 = 2a(x + e) - (x + e)^3,$$

$$\text{or, } 0 = 2ae - 2ex;$$

by rejecting e^3 , which is indefinitely small: whence again,

$$2ax = 2ex, \text{ or } x = a.$$

Again: required the value of x , in the equation $y^3 = ax^3 - x^3$, which renders the whole function a maximum.

Making, as before, $x = x + e$, we have

$$ax^3 - x^3 = a(x + e)^3 - (x + e)^3,$$

$$\text{or, } 0 = +2axe - 3e^2x - e^3;$$

by suppressing those powers of e above the first: whence,

$$3ex^2 = 2axe, \text{ or } x = \frac{2}{3}a.$$

These examples will be sufficient to shew the spirit of Fermat's rule, which is in principle much the same as the fluxional method; only that it wants that generality and elegance which constitute the distinguishing characteristics of the latter.

Descartes' Method.—This consisted in making two of the roots of the equation equal to each other; in which case, two of the ordinates of the curve became equal, and thus indicated the maximum or minimum state. This, however, being much less eligible than the preceding, we will not enter into farther explanation, but proceed to Hudde's method, which is in principle the same as Descartes's, but more elegant and concise.

Hudde's Method.—This, as we have observed, consisted, like that of Descartes, in making two of the roots of the proposed equation equal to each other, and for which he gave the following rule: *viz.* multiply each term of the equation, arranged according to the power of x , by the terms of an arithmetical progression, *viz.* the first by the first, the second by the second, &c.; and the equation thus obtained will indicate the maximum or minimum required.

Let us take, for example, the equation above, $ax^3 - x^3 = y^3$.

Arranging this equation according to the powers of x , and supplying the deficient term, we have

$$x^3 - ax^3 + 0x - y^3 = 0.$$

Arith. prog. $\begin{matrix} 3, & 2, & 1, & 0. \\ \hline 3x^3 - 2ax^3 = 0 \\ 3x^3 = 2ax^3, \text{ or } x = \frac{2}{3}a, \text{ as above.} \end{matrix}$

Again: let $x^2 - ax + y^2 - 2by + b^2$, be proposed.

Writing this, $x^2 - ax + (y^2 - 2by + b^2) = 0$.

Arith. prog. $\begin{matrix} 2, & 1, & 0. \\ \hline 2x^2 - ax = 0, \text{ or } x = \frac{1}{2}a. \end{matrix}$

This rule, though not so general as could be wished, is still extremely simple and ingenious; and, considering the state of analysis at the period it was discovered, it is highly creditable to its author, to whom we are also indebted for several other analytical and geometrical improvements.

Huygens' Method.—As the rule of Hudde, described above, was a simplification of that of Descartes, so the following one is founded on the principle of Fermat, and

can only be considered as a simplification of his method. Instead of substituting $x + e$ for x , and then cancelling the like terms, suppressing those in which e rises to a higher power than the first, and finally dividing by e ; Huygens, as also Sluse, arrive at the final equation at once by the following simple rule: multiply each of the terms in which x is found by its exponent, rejecting all those into which it does not enter; divide the result by x , and make the whole equal to zero; and the equation thus arising will give the value of x required.

For example: required the value of x in the equation $3ax^3 - x^3 = y$.

Multiplying each of those terms by the exponent of x in them, we have $6ax^3 - 3x^3$; then dividing by x ,

$$6ax^2 - 3x^2 = 0, \text{ or } 3x^2 - 6ax = 0,$$

$$\text{or, } x^2 - 2ax + a^2 = a^2, \text{ or } x = a \pm a;$$

that is, $x = 0$, or $2a$.

This rule differs in no respect from our fluxional operation, except that we divide by x instead of e ; yet the generality of the latter is such, that the rules above described have long been forgotten, and are only given here as presenting an historical view of the methods employed by our predecessors; and in this respect they are entitled to particular notice; for in them is evidently contained the germ of the modern analysis. Farther advances were made in these kinds of operations in the method of tangents, but they are foreign to our present enquiry; of these the *differential triangle* of Barrow is particularly interesting. See TANGENTS.

Of the method de maximis et minimis according to the fluxional or differential calculus.

1. The fluxion of a quantity, when it is a maximum or a minimum, is equal to zero, or 0. This is obvious from the definition of a fluxion, for this being the measures or rates of increase or decrease of a variable quantity; when this quantity becomes a maximum, or a minimum, its fluxion must be = 0, because at that point it admits of no farther increase or decrease.

2. If a quantity be a maximum or minimum, any power or root of that quantity must then evidently be a maximum or minimum. For the power or root of a quantity will increase or decrease as long as the quantity itself increases or decreases, and no longer.

3. Any constant multiple, or part, of a quantity, which is a maximum or a minimum, must also be a maximum or a minimum. For the multiple or part of a quantity will increase or decrease as long as the quantity itself increases or decreases, and no longer; therefore, when its fluxion is made equal to zero, the constant multiplier may be neglected.

4. The fluxion of a constant quantity = 0. For this admitting of no increase or decrease has no fluxion, or its fluxion = 0.

1. To divide a given number (a) into two such parts x and y , that $x^m y^n$ may be a maximum.

Since $x + y = a$, and $x^m y^n = a$ maximum, the fluxions of each = 0; the former because it is constant, and the latter because it is a maximum, whence

$$\dot{x} + \dot{y} = 0$$

$$m y^n x^{m-1} \dot{x} + n x^m y^{n-1} \dot{y} = 0;$$

from the first we have $\dot{x} = -\dot{y}$; and substituting this in the second, gives

$$m y^n x^{m-1} \dot{x} - n x^m y^{n-1} \dot{x} = 0, \text{ or}$$

$$m y^n x^{m-1} = n x^m y^{n-1}, \text{ or}$$

$$m y = n x; \text{ whence}$$

$$y =$$

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$$y = \frac{n}{m} x$$

Consequently, $x + \frac{n}{m} x = a$, or

$$x = \frac{m a}{m + n}, \text{ and } y = \frac{n a}{m + n}.$$

If $m = n$, then the two parts are equal.

Hence, to divide a quantity (a) into three parts, x, y, z , so that $x y z$ may be a maximum, the three parts must be all equal amongst themselves. For whatever one of the parts may be, if it be constant, the product of the other two will be the greatest when they are equal to each other; and in the same manner, if we consider any one of the parts as constant, the rectangle of the other two will be the greatest when they are equal to each other; whence it is obvious, that the product will be the greatest when the three parts are equal to each other. And in the same manner, if the given quantity be divided into any number of parts, the product of them, or the product of any equal powers of them, will be the greatest when the several parts are all equal amongst themselves.

2. To divide a given number (a) into two such parts, x and y , that the sum of their alternate quotients may be a maximum.

Here we must have $x + y = a$,

$$\text{and } \frac{x}{y} + \frac{y}{x} = \text{a maximum.}$$

Now since the first is constant, and the latter a maximum, we have $\dot{x} = -\dot{y}$, and

$$\frac{\dot{x} y - \dot{y} x}{y^2} + \frac{\dot{y} x - \dot{x} y}{x^2} = 0;$$

or, substituting for \dot{x} its equal $-\dot{y}$, this becomes

$$-\frac{y \dot{y} + x \dot{y}}{y^2} + \frac{x \dot{y} + y \dot{y}}{x^2} = 0, \text{ or}$$

$$\frac{x \dot{y} + y \dot{y}}{x^2} = \frac{y \dot{y} + x \dot{y}}{y^2};$$

whence we have $\frac{1}{x^2} = \frac{1}{y^2}$, or $y^2 = x^2$, or $x = y$; that

is, each of the required quantities is equal to $\frac{1}{2} a$.

3. Of all right-angled triangles, having the same hypothenuse; to determine that which shall have the greatest area.

Let the given hypothenuse be represented by b , and the required sides by x and y ; then we have these two equations;

$$x^2 + y^2 = b^2$$

$$x y = \text{a maximum.}$$

In the first we have $2 x \dot{x} + 2 y \dot{y} = 0$, or $\dot{x} = -\frac{y \dot{y}}{x}$;

in the second $\dot{x} y + \dot{y} x = 0$.

Substitute for \dot{x} , and we obtain

$$-\frac{y^2 \dot{y}}{x} + \dot{y} x = 0, \text{ or } y^2 = x^2, \text{ or } y = x;$$

and, consequently, both x and $y = \frac{a \sqrt{2}}{2}$.

This result is also readily obtained from the pure elements of geometry; for the hypothenuse being given, let there be described upon it a semicircle; then it is obvious, that the area of that triangle will be the greatest whose perpendicular, let fall upon the hypothenuse from the right angle, is the greatest; and this evidently is the case when that perpendi-

cular is equal to the radius, or when the right-angled triangle is also isosceles.

4. To find the greatest cylinder that can be inscribed in a given cone.

Let the altitude of the cone be represented by a , the diameter of its base by b , the altitude of the cylinder by x , and the diameter of its base by y : also put $.7854 = p$.

Now by similar triangles, as

$$a : b :: b - x : \frac{b}{a} (b - x) = y;$$

and by the question $p y^2 x = \text{a maximum}$, or substituting for y , and suppressing $\frac{b^3 p}{a^2}$, because it is a constant multiplier, we have

$$b^3 x - 2 b x^2 + x^3 = \text{a maximum, or}$$

$$b^3 \dot{x} - 4 b x \dot{x} + 3 x^2 \dot{x} = 0; \text{ whence}$$

$$3 x^2 - 4 b x = -b^2,$$

which reduced, gives $x = \frac{1}{3} b$.

5. To divide a given arc A into two parts such, that the m th power of the sine of one part, into the n th power of the sine of the other, may be a maximum.

Let P and Q represent the two arcs, x and y their sines, radius being unity, then we must have

$$x^m \times y^n = \text{a maximum,}$$

and consequently, $m y^n x^{m-1} \dot{x} + n x^m y^{n-1} \dot{y} = 0$;

whence we find $m \dot{y} \dot{x} = -n x \dot{y}$.

$$\text{Now } \dot{P} = \frac{\dot{x}}{\sqrt{(1-x^2)}}, \text{ and } \dot{Q} = \frac{\dot{y}}{\sqrt{(1-y^2)}}$$

from the known doctrine of fluxions; also

$$\dot{P} + \dot{Q} = 0, \text{ because } P + Q = A, \text{ whence } \dot{P} = -\dot{Q};$$

$$\text{or, } \frac{\dot{y}}{\sqrt{(1-y^2)}} = \frac{-\dot{x}}{\sqrt{(1-x^2)}}.$$

Multiply this equation by the equation

$$m y \dot{x} = -n x \dot{y},$$

and we obtain

$$m \times \frac{y}{\sqrt{(1-y^2)}} = n \times \frac{x}{\sqrt{(1-x^2)}}$$

or, which is the same,

$$m \cdot \tan. P = n \cdot \tan. Q,$$

whence

$$m : n :: \tan. Q : \tan. P$$

$$(m + n) : (m - n) :: (\tan. Q + \tan. P) : (\tan. Q - \tan. P)$$

But

$$(\tan. Q + \tan. P) : (\tan. Q - \tan. P) :: \sin. (Q + P) : \sin. (Q - P);$$

or, $(m + n) : (m - n) :: \sin. A : \sin. (Q - P)$;

whence, $\sin. (Q - P) = \sin. A \times \frac{m - n}{m + n}$.

Now, therefore, knowing the sine of the difference, we know also the difference of the arcs, whence the sum being also given, the arcs themselves are readily determined. We might have obtained the same result from the known trigonometrical formula; viz.

$$\sin. (P + Q) = \sin. P \cdot \cos. Q + \sin. Q \cdot \cos. P,$$

that is, the above notation remaining, and making

$$\sin. (P + Q), \text{ or } \sin. A = a.$$

$$x \sqrt{1-y} + y \sqrt{1-x^2} = a,$$

and we have also $x^m y^n$ a maximum: from which two equations the values of x and y may be determined; and, consequently, the area of which they are the foci.

6. To find the value of x in the equation $x^r = a$ a minimum. Make $x^r = z$, then $x \log. x = \log. z$, and

$$\dot{x} \log. x + x \times \frac{\dot{x}}{x} = \frac{\dot{z}}{z} = 0,$$

because, x^r , or z , is to be a minimum,

whence $\log. x = -1$,

that is, x is that number of which the hyperbolic logarithm is -1 .

Application of Maxima et Minima to physical Problems.

7. Given two elastic bodies A and C to find an intermediate body x , so that the motion communicated from A to C , through x , may be a maximum.

Put a = the given velocity of A , w the velocity communicated to C , and z the velocity communicated to x ; then by the known theory of elastic bodies

$$\begin{aligned} A + x : 2A :: a : w \\ x + C : 2x :: w : z \end{aligned}$$

taking the product of corresponding terms

$$(A + x + x^2 + AC + Cx) : 4Ax :: a : z, \text{ or}$$

$$A + x + \frac{AC}{x} + C : 4A :: a : z$$

Now as the two mean terms are constant, the last term varies inversely as the first; and, therefore, as the last is to be a maximum, the first term must be a minimum; and, consequently, its fluxion = 0; that is,

$$\dot{x} - \frac{AC \dot{x}}{x^2} = 0; \text{ whence } x = \sqrt{AC};$$

that is, x must be a mean proportional between the two given bodies.

8. To determine at what angle the wind ought to strike against the sails of a windmill, so that the effect to put it in motion may be the greatest possible.

Let x = the cosine of the required angle, then the $\sin.^2 = 1 - x^2$, radius being unity; hence by the principles of hydrostatics, the effect being as the product of the cosine into the square of the sine, we must have

$$x \times (1 - x^2) = x - x^3 = \text{a maximum,}$$

whence $\dot{x} - 3x^2 \dot{x} = 0$, or $x = \sqrt{\frac{1}{3}} = \text{col. } 54^\circ 44'$, which is the required angle.

9. Given the solidity of a cone to find the base and height, when the time of its vibration shall be a minimum, the point of suspension being at the vertex.

Let x = the radius of the base, y = the altitude, $p = 3.1416$; then $\frac{2}{3} p x y^2 = s$, the given solidity.

Now the distance of the point of suspension from the centre of oscillation, in a cone suspended at its vertex,

$$= \frac{4x^2 + y^2}{5x}. \text{ See OSCILLATION. And this, from the nature}$$

of the problem, must be a minimum.

$$\text{But } y^2 = \frac{3s}{p x}, \text{ whence } \frac{4x^2 + y^2}{5x} = \frac{4p x^2 + 3s}{5p x^2}.$$

This being put into fluxions gives

$$\frac{60p^2 x^3 \dot{x} - 40p^2 x^2 \dot{x} - 30psx \dot{x}}{25p^2 x^4} = 0,$$

$$\text{or, } 6p x^3 - 4p x - 3s = 0,$$

$$\text{whence } x = \sqrt[3]{\frac{3s}{2p}}, \text{ and } y = \sqrt[3]{2s} \times \sqrt[3]{\frac{3}{2p}},$$

consequently, $x : y :: 11 \sqrt{2}$.

10. To find the position of the planet Venus, when it gives the greatest quantity of light to the earth

Let S be the sun, (*fig. 1. Plate XIII. Analysis*.) E , the earth, V , Venus, produce EV , on which let fall the perpendicular SB , and with the centre V , and distance VS , describe the circular arc SA . Put $SE = a$, $SV = AV = b$, $EV = x$, $BV = y$; then $AB = b - y$, the versed sine of the angle SVA ; and by the known astronomical theory, the quantity of light received by the earth from

$$\text{Venus varies as } \frac{b-y}{x^2} = \frac{b}{x^2} - \frac{y}{x^2} = \text{a maximum.}$$

Again, (Euclid, b. ii. p. 12.) $a^2 = b^2 + x^2 + 2xy$; therefore, $y = \frac{a^2 - b^2 - x^2}{2x} = \frac{m^2 - x^2}{2x}$ (by making $m^2 = a^2 - b^2$).

Hence, the quantity of light varies as

$$\frac{b}{x^2} - \frac{m^2 - x^2}{2x^3} = \frac{2bx - m^2 + x^3}{2x^3} = \text{a maximum;}$$

hence its fluxion

$$\frac{(2b\dot{x} + 2x\dot{x})2x^3 - 6x^2\dot{x}(2bx - m^2 + x^3)}{4x^6} = 0,$$

$$\text{or, } (2b + 2x)2x^3 - 6x^2(2bx - m^2 + x^3) = 0,$$

whence by reduction, &c.

$$-x^2 - 4bx + 3m^2 = 0,$$

$$\text{therefore, } x^2 + 4bx = 3m^2,$$

$$\text{and hence, } x = -2b \pm \sqrt{4b^2 + 3m^2}$$

Since then, we know the three sides of the triangle ESV , the angle E of elongation is readily found = $39^\circ 44'$.

We might have extended these kinds of problems to a much greater length, had the limits of our article admitted of it; but it is presumed that the above will throw considerable light on the subject; and render the application of these principles easy and familiar in most other cases. The reader who is desirous of farther information relating to the method of maxima et minima, as applicable to mechanical and astronomical subjects, may consult Dealtry's Principles of Fluxions, or Vince's Treatise on the same subject: see also Simpson's and Maclaurin's Treatises on Fluxions, to the former of which works we are indebted for the following article.

Application of Maxima et Minima to curve Lines.—Having already considered this subject at considerable length under the article ISOPERIMETRICAL Problems, we shall, therefore, be very brief in our observations with regard to them in this place; but as there are certain problems of this kind, which easily yield to the ordinary method of maxima et minima, we thought it right to touch slightly on this subject in the present article.

To find the nature of curves, in which some conditions being invariable, others become the greatest or the least possible.

1. Given the length of a curve to find the area a maximum.

It is evident, that by merely putting the fluent $y \dot{x}$ a maximum,

maximum, no solution can be obtained; for no limitation is expressed, and the fluent will admit of increase or decrease without limit. But as the length is given, the $f. \dot{z}$, so far as concerns the $f y \dot{z}$, is a given quantity; therefore, the

$$f. y \dot{x} \pm f. \dot{z} \text{ must be a maximum:}$$

or, rendering the terms homogeneous, in order that they may admit of comparison,

$$f. y \dot{x} \pm f. a \dot{z} = \text{a maximum.}$$

Now if for every individual value of y , this flowing quantity be always a maximum, the whole fluent will be so likewise; but for every such value of y , the flowing quantity is $y \dot{x} \pm a \dot{z}$. Hence the nature of the curve will be determined by ascertaining what relations of \dot{x} and \dot{z} will render $y \dot{x} \pm a \dot{z}$ a maximum for any given value of y ; or the fluxion of $y \dot{x} \pm a \dot{z} = 0$, whilst y is constant; and this must be the case for every successive value of y throughout; so that in each limiting portion of the area, for every value of y , the ratio of $\dot{x} : \dot{z}$ must be such as to make $y \dot{x} \pm a \dot{z}$ a maximum,

therefore $y \ddot{x} \pm a \ddot{z} = 0$; but $\dot{z}^2 = \dot{y}^2 + \dot{x}^2$;

whence $\dot{z} \ddot{z} = \dot{x} \ddot{x}$, and $\ddot{z} = \frac{\dot{x} \ddot{x}}{\dot{z}}$;

consequently, $y \dot{x} = \mp \frac{a \dot{x} \ddot{x}}{\dot{z}}$, and $y \dot{z} = \mp a \dot{x}$.

But from the nature of the problem $y \dot{z}$ must be positive, and, therefore, the true result is $y \dot{z} = a \dot{x}$.

Now, in the circle $a : y :: \dot{z} : \dot{x}$; whence $a \dot{x} = y \dot{z}$. Hence the curve required is a circle; in which the length being given, the area is a maximum.

Therefore, if A and B denote any functions of x and y , and $\dot{x} = \sqrt{c^2 + \dot{y}^2}$, where c is constant, the expression $A \dot{x} \mp B \dot{y}$ is a maximum, or a minimum, when $A \dot{y} = \mp B \dot{x}$, or the functions of x and y are reciprocal.

2. To determine the nature of a curve, which generates a surface, so that the surface being given, the solid may be a maximum.

Here $f. 2 p y \dot{z}$, or $f. y \dot{z}$ is given; and $f. y^2 \dot{x}$ is a maximum; hence the fluent of $a y \dot{z} \pm$ fluent of $y^2 \dot{x}$ a maximum;

or, $f. a y \dot{z} \pm f. y^2 \dot{x} = \text{a maximum};$

therefore, $a y \dot{x} = y^2 \dot{z}$, or $a \dot{x} = y \dot{z}$, which is a property of the circle, and the body is a sphere.

3. To determine the nature of the generating curve, that the solidity being given, the surface may be a minimum.

Here $f. y^2 \dot{x}$ is given, and $f. a y \dot{z}$ is a minimum; therefore, $y^2 \dot{z} = a y \dot{x}$, and $y \dot{z} = a \dot{x}$: the required curve, therefore, is a circle, and the body a sphere.

The same principles are employed in the work above quoted, to the finding of the solid of least resistance, and a few other problems of the same kind; but as we have already considered these under a more general form in the article ISOPERIMETRY, we shall not pursue the subject any farther in this place.

To ascertain the number of maxima or minima that appertain to any variable function.

In the preceding problems it has generally happened, that the equations from which we have derived our maximum or minimum have been of the first degree; and, therefore, admitted of only one rational value; but it may happen that the final equation is of a higher dimension, and, consequently, admitting of several roots, each of which may be employed, at least so far as we have considered the subject at present: also, as our operation is precisely the same, whether we are

seeking a maximum or a minimum, it is necessary to have some means of determining, *a priori*, which root gives the maximum, and which the minimum, as well as to ascertain the number of each.

In our former definition, we stated a maximum, or minimum, to be the greatest or least state of a variable function; which was done in order to simplify the idea, being in fact the real import of the word; and in any question of a physical nature, the term must be still understood in this light. That is, if the fluxional equation be of such a degree as to admit of several roots, that one must be found which makes the result the greatest, or least possible; but analytically, we must understand this term to signify that state of a variable function, which, if the variable upon which it depends be either increased or decreased, the whole function will decrease or increase, according as it is in its maximum or minimum state; but this increase or decrease is frequently limited, and being carried beyond a certain point, the whole function will again increase or decrease. This will be more obvious, from (fig. 2. Plate XIII. Analysis.) where the several ordinates AB, EF, IK , are maxima, and CD, GH , are minima, any one of which, as for example EF , will be observed to recede from its maximum towards a minimum, as it approaches towards C or D ; but beyond those points, it again approaches towards its other maximum value. The object, therefore, of our present enquiry, is to ascertain the number of maxima or minima that a function may have, and which root of the final equation gives the one, and which the other.

In order to this, let y be any function of x , and suppose that x has attained that particular value which renders the function y a maximum or a minimum; it follows then, if x be either increased or diminished by any quantity h , that we ought to obtain for the whole function a result less or greater than the preceding, according as it was in its maximum or minimum state. Now, if we represent by y' the function answering to $x + h$, and by y'' the function answering to $x - h$, we shall have from Taylor's theorem

$$y' = y - \frac{h \dot{y}}{1 \cdot \dot{x}} + \frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2} - \frac{h^3 \dot{\ddot{y}}}{1 \cdot 2 \cdot 3 \dot{x}^3} + \&c.$$

$$y'' = y + \frac{h \dot{y}}{1 \cdot \dot{x}} + \frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2} + \frac{h^3 \dot{\ddot{y}}}{1 \cdot 2 \cdot 3 \dot{x}^3} + \&c.$$

And since the powers of a quantity which is less than unity become less and less as the exponent is greater, it may be readily conceived, that h may be taken so small, that each of the terms of the preceding series may be greater than the sum of all the following ones; and, consequently, the sign of the whole series, beginning at any term, will always be the same as that of the first term, as to positive or negative.

Therefore, if $\frac{h \dot{y}}{\dot{x}}$ be any thing but zero, y will be greater than y' , and less than y'' ; and, consequently, is neither a maximum nor minimum; therefore, when it is either the

one or the other, $\frac{h \dot{y}}{\dot{x}} = 0$. In this case, we have

$$y' = y + \frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2} - \frac{h^3 \dot{\ddot{y}}}{1 \cdot 2 \cdot 3 \dot{x}^3} + \&c.$$

$$y'' = y + \frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2} + \frac{h^3 \dot{\ddot{y}}}{1 \cdot 2 \cdot 3 \dot{x}^3} + \&c.$$

where it is obvious that $y > y'$, and $> y''$; or $y < y'$,

$< y''$, according as $\frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2}$ is negative or positive; and

is, therefore, necessarily a maximum or a minimum.

But if $\frac{h^2 y}{1.2x^2} = 0$, then again y is neither a maximum nor a minimum; for in this case, y is $> y'$, and $< y''$. We have, therefore, the following rule for ascertaining the maxima et minima of any proposed function. Find the value of x in the equation $\frac{y}{x} = 0$, and substitute it for x in the expression $\frac{y}{x^2}$; then if the result is negative, y is a maximum, if positive, a minimum; and if it be zero, then y is neither a maximum nor a minimum, unless also $\frac{y}{x^3}$ be equal to zero; and then it will depend upon the sign of $\frac{y}{x^4}$; and so on, and the same process being observed, with regard to each of the roots of the fluxional equation, the number of maxima et minima will be obtained.

Let us illustrate the preceding rule by an example.

1. Find $y = x^4 - 8x^3 + 22x^2 - 24x + 10$, a maximum or minimum. Here

$$\frac{y}{x} = 4x^3 - 24x^2 + 44x - 24 = 0;$$

where $x = 1, 2$, and 3 .

And it is required to find which of these roots answers to the maxima, and which to the minima. Now

$$\frac{y}{x^2} = 12x^2 - 48x + 44.$$

And here, making $x = 1, 2, 3$, the results are respectively $+$, $-$, $+$; therefore the root 2 answers to the maximum, and the other two to the minima.

2. Let there now be proposed the function

$$y = x^5 - 7x^4 + 19x^3 - 25x^2 + 16x + 10.$$

Here $\frac{y}{x} = 5x^4 - 28x^3 + 57x^2 - 50x + 16 = 0$.

And the roots of this equation are $1, 1, 2, 1\frac{1}{2}$. Now

$$\frac{y}{x^2} = 20x^3 - 84x^2 + 114x - 50,$$

which $= 0$, when $x = 1$; therefore the root 1 gives neither a maximum nor a minimum, unless $\frac{y}{x^3} = 0$; which upon trial does not obtain.

But by assuming $x = 2$ in this equation, the result is -4 ; and, consequently, this value of x answers to a maximum.

And by submitting the other root $1\frac{1}{2}$ to the same test, a similar result will be obtained.

We will add another example, with which we must conclude this article.

3. To find when the function

$$y = x^3 - 18x^2 + 96x - 20$$

becomes a maximum or a minimum.

Here $\frac{y}{x} = 3x^2 - 36x + 96 = 0$,

in which equation the roots are $x = 4, x = 8$.

Now $\frac{y}{x^2} = 6x - 36$.

Here the root 8 gives $\frac{y}{x^2}$ positive.

And the root 4 gives $\frac{y}{x^2}$ negative.

Therefore the former answers to the minimum, and the latter to the maximum.

If the fluxional equation has no real root, then it follows that the proposed function admits of neither a maximum nor a minimum; but increases or decreases *ad infinitum*.

MAXIMENE, in *Geography*, a town of Walachia; 18 miles N. of Galacz.

MAXIMIANOPOLI, a town of European Turkey, in Romania, founded by the emperor Maximian; formerly the see of a bishop, in the province of Rhodope, but now a small place 60 miles S.W. of Adrianople.

MAXIMIANOPOLIS, in *Ancient Geography*, a town of Palestine, the same as Hadad-Rimmon, in the valley of Jezreel, and in the plain of Megiddo. An ancient traveller places it 17 miles from Caesarea, and 10 from Jezreel.—Also, a town of Thrace, in Media, upon the northern bank of the Marsh Buton; called also Myxxa. See MAXIMIANOPOLI.

MAXIMIANUS, HERCULIUS MARCUS AURELIUS VALERIUS, in *Biography*, a native of Sirmium, in Pannonia, was the son of parents who gained their daily subsistence by the labour of their hands. Brought up in rustic manners, and destitute of every advantage of education, he early embraced that way of life which alone presented the prospect of advancement, and enlisted as a common soldier in the Roman armies. Aspiring to something better than the servile character which he then held, he gradually rose through the several stages of command, distinguished by strength and hardiness of body, and the military virtues of courage and obedience. He fought under the emperors Aurelian and Probus on the banks of the Danube, Rhine, Euphrates, and borders of the ocean, acquiring the talents of an experienced soldier, if not of a great general. His manners were not changed in his progress, but he remained rude and ferocious, with a propensity to the grossest debauchery. In the course of his service, he contracted an intimacy with his fellow-soldier Dioclesian, who, when elevated to the imperial dignity, remembered the valour, courage, and hardihood of Maximianus, and rewarded his fidelity by making him his colleague in the empire, and by ceding to him the command of the provinces of Italy, Africa, and Spain, and the rest of the western territories of Rome. The personal superiority of Dioclesian was, however, recognized in the assumed epithet of *Jovius*, while Maximian took that of *Herculius*. Maximianus shewed the justness of the choice of Dioclesian by his victories over the Barbarian tribes with whom he was called to contend. As soon as Dioclesian entered into the twentieth year of his reign, he celebrated, in conjunction with Maximian, that memorable era, as well as his own great successes, by the pomp of a Roman triumph. (See *DIOCLESIAN*.) This triumph was dignified by several circumstances of superior celebrity and good fortune. Africa and Britain, the Rhine, the Danube, and the Nile, furnished their respective trophies; but the most distinguished ornament was of a more singular nature, a Persian victory, followed by an important conquest. The representation of rivers, mountains, and provinces were carried before the Imperial car. The images of captive wives, the sisters and the children of the great king, afforded a new and grateful spectacle to the vanity of the people. Not long after this, a severe illness inspired Dioclesian with the design of abdicating his power, which resolution he carried

into effect in the month of April or May, 305. Maximian was induced by his authority to follow his example, and on the same day divested himself of the purple at Milan, and retired to a delightful villa in Lucania. In the course of a few months, as we have seen in the article MAXENTIUS, he, at the desire of his son, re-assumed the imperial dignity, and was now anxious that this son should yield all authority into his hands. This singular contest for empire between father and son, and its decision, have already been noticed. Maximian retired in confusion into Illyricum, and endeavoured to engage Galerius in his cause. Disappointed in his expectations, he returned to the court of his son-in-law, Constantine, apparently contented with his lot, but in truth watching an opportunity for recovering his power; and while Constantine, in 309, was engaged on the banks of the Rhine in repelling an invasion of the Franks, he spread the report of Maxentius' death, and hastily resumed once more the ensigns of office. The intelligence of this event caused Constantine to return speedily into Gaul, who seized upon Maximian, and confined him to the palace under strict watch; but without intending to inflict a severer punishment. The clemency of Constantine inspired Maximian with the dark design of murdering him; and he had the wickedness and temerity to solicit his daughter Fausta to join him in the conspiracy. She informed her husband of the plot, and through their contrivance, a slave, who was an eunuch, was placed in the emperor's bed, whom Maximian stabbed to the heart, on the supposition that it was his master. Upon this detection he was judged unworthy to live, and being permitted to choose his death, he strangled himself. Such is the generally accredited account; but Gibbon represents the matter differently: he says, that Maximian was delivered into the hands of his son-in-law by the treachery of his army, in consequence of which, a secret and irrevocable sentence of death was pronounced against the usurper, and he obtained the same favour which he granted to Severus, and it was published to the world, that, oppressed by the remorse of his repeated crimes, he strangled himself with his own hands. "After he had lost the assistance, and disdained the moderate counsels of Dioclesian, the second period of his active life was a series of public calamities and personal mortifications, which were terminated in about three years by an ignominious death. He deserved his fate; but we should find more reason to applaud the humanity of Constantine, if he had spared an old man, the benefactor of his father, and the father of his wife. During the whole of this melancholy transaction, it appears that Fausta sacrificed the sentiments of nature to her conjugal duties." Gibbon. *Univer. Hist.*

MAXIMILLIAN I., emperor of Germany, born in 1459, was son of the emperor Frederic IV. In early life he was so dull and apparently deficient, that he was for several years considered rather in the light of an idiot. About ten years of age he became remarkably addicted to learning, and acquired, with surprising quickness, the Latin, French, and Italian languages. In his twentieth year his father effected a marriage between him and Mary, the heiress of the great house of Burgundy. Lewis XI. of France having seized part of her inheritance in the Low Countries, Maximilian made war against him, defeated his troops, and recovered great part of the usurped territories. He also suppressed the revolts which broke out in various parts of the Low Countries. As he was proceeding in a career of success, he had the misfortune to lose his wife, a circumstance that gave a shock to his authority, and the guardianship of his children was immediately contested by the states. A civil war ensued, which at length was accom-

modated on the condition that he should continue tutor to his son Philip, under restrictions. In 1486, Maximilian was elected king of the Romans, and crowned at Aix-la-Chapelle: upon his arrival at Bruges to meet the states-general in 1488, the inhabitants ran to arms to secure his person, being suspicious that he was inimical to their rights and liberties; at the same time they imprisoned some of his counsellors, four of whom they beheaded. The people of Ghent followed their example; but, after suffering a kind of imprisonment for ten months, he was liberated. In 1493, he succeeded, by the death of his father, without opposition, to the imperial dignity. He marched at the head of an army against the Turks, who had invaded Croatia, but they retreated before he could reach them. In 1494, he took for his second wife Blanche, the sister of John Galeazzo, duke of Milan, an alliance which engaged him in the affairs of Italy; and when Charles VIII. of France had made himself master of the kingdom of Naples, Maximilian joined in the confederacy of the pope, the king of Spain, and several Italian powers to oppose his arms. He also effected a marriage between his son Philip and the infanta Jane, daughter of Ferdinand and Isabella, by which the Low Countries eventually fell under the dominion of Spain. After the retreat of Charles from Italy, Maximilian, in 1496, engaged in an expedition into that country, and laid siege to Leghorn; but, failing in his attempts, he returned with disgrace. He next attempted to reduce the Swiss; but seven defeats, within six months, made him glad to terminate the war in 1500 by a treaty. After the death of his son Philip, in 1507, he obtained the regency of the Low Countries, of which he constituted his daughter Margaret governess. The famous league of Cambray against the Venetians took place in 1509, to which Maximilian was one of the contracting parties. His troops took possession of Friuli and Istria, and he, at the head of a great army, laid siege to Padua, but was obliged to abandon the enterprise. When pope Julius deserted the league and declared war against the French, Maximilian endeavoured to get him deposed, in order that he himself might succeed to the papacy; but his scheme entirely failed. For a large subsidy he engaged to assist Henry VIII. in his invasion of France; but failing in his engagement, he came in person with a few German troops, and flattered the vanity of the English monarch, as well as gratified his own avarice, by serving under him for the pay of a hundred crowns a day. On the accession of Francis I. he made peace with that monarch, who thereby regained the Milanese. He took little or no part on the subject of the Reformation at its commencement; but at the solicitation of the monks he applied to Leo X. to terminate the religious disputes by his own decision, and he summoned Luther to appear, with the promise of a safe conduct, before the diet of Augsburg. He was particularly anxious to secure the succession to the imperial crown for his grandson Charles; but in the midst of his cares on this subject he died in January, 1550. In his private character he was amiable and respectable; but as a public man he wanted that decision which constitutes true dignity in a prince. He was beneficent and humane, and his memory is still cherished in Germany for abolishing the famous secret tribunal of *Weistphalia*. He was author of some poems, and composed memoirs of his life. *Univer. Hist.*

MAXIMILLIAN II., emperor of Germany, son of Ferdinand, was born at Vienna in 1527. He was educated in Spain under his uncle, Charles V., whose daughter he married, and he governed that country three years in the name of his father-in-law. After his father had ascended the

imperial throne, he conferred on Maximilian, in 1562, the crowns of Hungary and Bohemia, and caused him to be elected king of the Romans; and upon the death of Ferdinand, in 1564, he succeeded to the empire without any opposition. He was already distinguished for prudence and moderation, and well acquainted with the languages and dispositions of the various people under his sway. The spirit of his administration was pacific, and his reign, for the most part, tranquil. The Protestants of Austria, who had been very useful to the emperor in lending him money to carry on the Turkish war, and afterwards cancelled the debt, requested to be indulged in the free exercise of their religion, which he readily granted. He was not contented to do good himself, but endeavoured, by all the means in his power, and by strong remonstrances to his cousin, Philip king of Spain, to put a stop to the cruelties exercised by Alva in the Low Countries; but that bigot refused to listen to his advice, or to follow his example. Actuated by the same principles, he forbade Charles IX. to make levies in Germany for the purpose of exterminating the French Hugonots, though he could not prevent the Protestant princes of Germany from sending succours to their persecuted brethren in France. Twice he solicited the crown of Poland, with the intention of conveying it to his second son, but want of activity prevented him from attaining his object: he had, however, been successful in securing to his eldest son Rodolph the reversion of the empire, and of the kingdoms of Bohemia and Hungary, and avowed his intention of supporting his claim to the kingdom of Poland by force of arms; but this purpose, if real, was defeated by his death, which happened in 1576. He had, it was said, for some time previously to the event, devoted many of his leisure hours to the contemplation of a future state; and had been accustomed to discourse, in his familiar parties, upon the immortality of the soul, which he looked to not only without terror and dismay, but with hope and Christian confidence. Maximilian II., says the historian, "appears to have been one of the most amiable princes that ever swayed the imperial sceptre. No individual ever complained of having heard a harsh expression from his lips, none ever departed dissatisfied from his audience. So regular were his economical arrangements, that to every act of his life its appropriate hour was allotted; and every day after dinner the meanest of his subjects was at liberty to approach him. A faithful husband, an affectionate parent, and a passionate lover of truth, his example had considerable influence on the manners of his people, and the empire flourished in a peculiar manner under his administration." Univer. Hist.

MAXIMILIAN, duke of Bavaria in the 17th century, was called, on account of his courage and success, the Defender of Germany; and, for his singular prudence, he acquired the name of Solomon. He zealously opposed the Protestants, and was considered as one of the principal supporters of the Catholic religion. In 1620, he gained the battle of Prague against Frederic, prince palatine, who had been elected king of Bohemia. For these services Maximilian was named an elector of the empire. He died in 1651, aged 70. Moreri.

MAXIMIN, ST., in *Geography*, a town of France, in the department of the Var, and chief place of a canton, in the district of Brignoles; 20 miles N. of Toulon. The place contains 3717, and the canton 9778 inhabitants, on a territory of $412\frac{1}{2}$ kilometres, in nine communes. N. lat. $43^{\circ} 28'$. E. long. $5^{\circ} 55'$.

MAXIMINUS, CAIUS JULIUS VERUS, in *Biography*, a Roman emperor, raised to this high rank from almost the lowest class of society, was born in Thrace, A.D. 183.

His father was a barbarian of the Gothic nation, his mother an Alan, and he himself was brought up to attend the herds and flocks. In this station he had frequent opportunities of exhibiting his prowess in combating the bands of robbers who overran the country. He is said to have attained to a gigantic stature, and a correspondent strength of body, which produced, in an uncultivated mind, a savage and ferocious character. He was both the pride and the dread of his district, at the time when the emperor Severus, returning from the East, halted in Thrace, to celebrate the birthday of his son Geta. "The country," says Gibbon, "flocked in crowds to behold their sovereign, and a young barbarian of gigantic stature earnestly solicited, in his rude dialect, that he might be allowed to contend for the prize of wrestling. As the pride of discipline would have been disgraced in the overthrow of a Roman soldier by a Thracian peasant, he was matched by the stoutest followers of the camp, sixteen of whom he successively laid on the ground. His victory was rewarded by some trifling gifts, and a permission to enlist in the troops. The next day, the happy barbarian was distinguished above a crowd of recruits, dancing and exulting after the fashion of his country. As soon as he perceived that he attracted the emperor's notice, he instantly ran up to his horse, and followed him on foot, without the least appearance of fatigue, in a long and rapid career. "Thracian," said Severus, with astonishment, "art thou disposed to wrestle after thy race?" Most willingly, sir, replied the unwearied youth; and, almost in a breath, overthrew seven of the strongest soldiers in the army. A gold collar was the prize of his matchless activity, and he was immediately appointed to serve in the horse-guards who always attended on the person of the sovereign." As a soldier he distinguished himself no less by his attention to military discipline than by his valour, and his ferocity bent to the spirit of obedience and subordination. Under Caracalla he rose to the rank of centurion, but he nobly refused to serve under the assassin of that prince, and retiring to his native place he purchased property, and carried on a commerce with the barbarous tribes from which he derived his origin. During the reign of the monster Heliogabalus he kept at a distance from the court, notwithstanding the solicitations of his friends to take a military tribuneship. Alexander Severus knew the worth of Maximinus, and committed to his care a legion of new recruits; the duties of which station he fulfilled with the utmost assiduity, bestowing the minutest attention upon their exercise, arms, health, and apparel. When he was told by a person of considerable rank, that in such a career of promotion he need not trouble himself, he indignantly replied, "I am of a different opinion, the higher I rise the more I shall labour." Though, as an officer, he was a strict disciplinarian, his manners, and the figure of his person, rendered him extremely popular among the soldiery, who gave him the appellations of Ajax and Hercules. His elevation began to inspire him with ambitious views, which effaced the sentiments of affection, gratitude, and duty: he aspired to the throne, and was proclaimed, by the army, emperor, in the year 235. The decree of the soldiery was confirmed by an always complying senate, and one of his first acts was to confer on his son, a youth of fine talents, the title of Cæsar. His heart now became callous to the feelings of honour and humanity; he not only removed from his presence the friends and advisers of the late emperor, but put many of them to death upon the slightest and most frivolous grounds. A conspiracy against his person afforded him a better pretext for the most sanguinary cruelty, and a vast number of persons of rank lost their lives on the occasion, with various circumstances

circumstances of barbarity. He now became the object of universal dread and detestation, and was, in a short time, such is the progress of vice and cruelty, grounded on ambition, ranked among the most bloody tyrants that ever disgraced the Roman purple. He still had the art to retain the attachment of his army, in whom he confided, and crossing the Rhine into Germany with numerous and well-disciplined battalions, he laid waste a wide tract of country with fire and sword, and destroyed a great number of natives who opposed him. In these actions he displayed the skill of a general, with the bravery of a private soldier, and made it sufficiently evident that war was the true theatre of his glory. After two campaigns, he passed the winter of the year 236 at Sirmium, occupied in raising money by the severest exactions, which, by means of his officers, were extended to all the provinces of the empire. The procurator of Africa carried his extortions to such an intolerable excess that a conspiracy was formed against him, to which his life fell a sacrifice; and in the year 238, Maximinus and his son were dispatched by an indignant and suffering people, who, fixing their heads upon spears, displayed them as trophies through the army, who received the intelligence with joy, and united in declarations of fidelity to the senate and its decisions. Maximinus has been reckoned, by ecclesiastical writers, among the persecutors of the Christians, but the candid historian does not readily admit the title of "the sixth persecution" to be justly applied to the reign of this emperor. He is described, by Gibbon, as a brutal savage, destitute of every sentiment that distinguishes a civilized, or even a human being. "The body," says he, "was suited to the soul." The stature of Maximinus exceeded the measure of eight feet, and circumstances almost incredible are related of his matchless strength and appetite. Had he lived in a less enlightened age, tradition and poetry might well have described him as one of those monstrous giants, whose supernatural power was constantly exerted for the destruction of mankind. Gibbon. Univer. Hist.

MAXIMINUS, C. GALERIUS VALERIUS, a Roman emperor, son of the sister of the emperor Galerius, was in the year 305, upon the abdication of Dioclesian and Maximian, raised, by the influence of his uncle, to the rank of Cæsar, and, in the division of the empire, the provinces of Egypt and Syria were placed under his government. When Licinius, in 307, was raised by Galerius to the rank of Augustus, Maximinus, disdainful of an inferior title, insisted on the same elevation, and upon some reluctance on the part of Galerius to grant it, he caused himself to be nominated to that dignity by his assembled troops: thus at one and the same time, the Roman world, in the year 308, witnessed six Augusti or emperors. On the death of Galerius, in 311, Maximinus shared his dominions with Licinius, and added Asiatic provinces to his former possessions. In the contest between Maxentius and Constantine, Maximinus secretly allied himself with the former, though he took no open part in the war. When Galerius issued his edict in favour of the Christians, Maximinus, though an enemy to them, thought proper to concur. Still he had a great desire to re-establish the Pagan worship, with all its impostures of magic and divination. He was preparing to renew the persecution, and, in the mean time, he not only gave to the ancient religion a system of church government copied from the Christians, and threw about it all the lustre of the state, but employed every art to discourage and vilify Christianity. He is also charged with having published and carefully disseminated a false narrative of the death of Jesus Christ, filled with the most injurious representations. The principal cities of his dominions, as Nicomedia, Antioch, and Tyre,

were instigated to send addresses to him, expressing their abhorrence of the Christians, and imploring that they might be expelled. These, however obtained, led to the infliction of cruel and ignominious punishments and to the destruction of some lives. The dangers that menaced Christianity in Asia were averted by the war, which, in 313, took place between Maximinus and Licinius. The latter had made an alliance with Constantine, and the apprehension of its consequences seems to have been the chief motive of Maximinus, who began the attack. He was entirely defeated, and was obliged to seek his safety in a rapid flight; and it is said he reached Nicomedia, a distance of 160 miles, in the space of twenty-four hours from the conclusion of the battle. He retreated to Tarsus, where, in a few months, death put an end to his disgrace. His whole family was sacrificed to the vindictive rage of the conqueror. Gibbon. Univer. Hist.

MAXIMUS, M. CLAUDIUS PAPIENUS, a Roman emperor, was the son of a mechanic, but having a desire to enrol himself in the army, he enlisted at an early age, and became distinguished first as a soldier, and afterwards in some of the public offices of state. In 227 he obtained the consulate, and was afterwards proconsul of Bithynia, Greece, and Narbonnensis Gaul, and was appointed to military commands in various parts of the Roman empire. As prefect of Rome, he displayed intelligence, firmness, and severity, so that he acquired a general respect, accompanied with an awe, approaching almost to terror. In 237, when the murder of the Gordians deprived Rome of the emperors it had chosen in the place of the tyrant Maximinus, the merit of Maximus caused him to be invested with the purple together with Balbinus. Some opposition was first made to his accession, and it was resolved to add the younger Gordian, then a child, to the emperors already chosen. At length Maximus was received with joyful acclamations as the deliverer of his country, and the conduct of the three emperors seemed to promise the restoration of an equitable and wise government to the Roman world. The various nature of their talents seemed to appropriate to each his peculiar department of peace and war, without leaving room for a jealous emulation. Justice was regularly administered, wholesome laws were enacted, and oppressive taxes were repealed or moderated. Discipline was revived, and with the advice of the senate many excellent regulations were introduced into the several departments of government. The pretorian bands, accustomed to depose and to make emperors at their pleasure, soon shewed symptoms of discontent under a sovereignty which they had not established, and apprehended that the reign of law and order would be destructive of their power. They accordingly seized upon the opportunity when the citizens were occupied in the Capitoline games, rose in mutiny, and marched towards the palace: laid hold of the two emperors, treated them with every mark of insult, and, to prevent the possibility of a rescue, took away their lives, leaving their bodies, mangled with a thousand wounds, exposed to the insults or the pity of the populace. Gibbon. Univer. Hist.

MAXIMUS, PETRONIUS, an emperor of the West in the fifth century, was a Roman of noble birth. Possessed of an ample patrimony, and adorned with liberal arts and elegant manners, he obtained the favour of the prince and the senate, and of course rose to high and important offices in the state. In March 455, Maximus was elected emperor, in the room of Valentinian, who had, on account of his vices and tyranny, been assassinated. In a few hours he was convinced that happiness and sovereignty were generally at variance, and he was heard to exclaim, "Happy Damocles, whose reign began and ended with a dinner!" His own power

was very short-lived; when attacked by Genserich, king of the Vandals, in Africa, he was deprived of all courage and presence of mind, and thought of nothing but how to make his escape. Cowardice in a prince is always hateful and contemptible, and as soon as his intentions were known, the people, who would probably have rallied round him, had he been inclined to defend his country, rose upon him, and a soldier gave him a fatal blow. His body was ignominiously dragged through the streets and thrown into the Tiber. Such was his end, after a reign of less than three months. Gibbon. Univer. Hist.

MAXIMUS MAGNUS, an imperial usurper of the fourth century, a native of Spain, and probably of low origin, served in Britain with Theodosius, afterwards emperor, and established a character for valour and abilities, though it does not appear that he rose to any important rank, either civil or military. He was invested with the imperial purple in the year 383, by the army among whom he had excited discontent and disaffection against Gratian, emperor of the West. This took place while he was in Britain, but he determined to carry his arms to the continent, and contend with the lawful emperor upon his own ground. He transported into Gaul so great a number of Britons, that the emigration at that period weakened the population of the island, and they afterwards settled in Bretagne. As he advanced he was joined by the Gallic armies, and even the household troops deserted Gratian, then resident at Paris. He fled before the usurper, and was put to death at Lyons. Maximus was now acknowledged as emperor by all the provinces of the West, and he declared his infant son Victor his colleague, and proposed an alliance to Theodosius, emperor of the East, which was accepted, on condition that he should not pass the Alps, beyond which Valentinian, the brother of Gratian, reigned over Italy, Illyrium, and Africa. The ambition of Maximus, however, would not permit him to rest; in 387 he invaded Italy, and took possession of Milan, without opposition. Valentinian fled to implore the assistance of Theodosius, who, while the usurper was employed in reducing the towns of Italy, levied an army to oppose him. A battle decided the fate of Maximus; as soon as he was defeated, his own soldiers rose upon him, dragged him away and struck off his head. His son Victor met with a similar fate in Gaul. These events took place in the year 388. Maximus is stigmatized as the first Christian prince who shed the blood of his Christian subjects, on account of their religious opinions. Gibbon. Univer. Hist.

MAXIMUS TYRIUS, a celebrated philosopher, and elegant writer in the second century, was a native of Tyre in Phœnicia, whence he derived his name. He probably came to Rome in the year 146, where he received from the emperor Marcus Aurelius many tokens of esteem and regard. This emperor is said to have placed himself under the instructions of the philosopher, though some writers imagine that this high honour belonged to another Maximus of the Stoical sect. Maximus adopted the principles of Plato, but with an evident leaning to scepticism. There are forty-one of his "Dissertations," on philosophical topics, still extant, which display much sound argument, and real eloquence. These have been very frequently printed. The first Latin version was published at Basil in 1519, and the original Greek was printed for the first time by Henry Stevens, in 1557. In 1607, Daniel Heinsius published an edition of them at Leyden, in Greek and Latin, illustrated with notes. A new impression of this edition was printed at Cambridge in 1703, with corrections, additional notes and indexes, by Dr. John Davies. Enfield. Hist. Phil. Harwood.

MAXIMUS, named "The Cynic," a native of Ephesus, who studied under Celsus of Cappadocia, a philosopher of the Eclectic school, and immediate successor of Jamblichus. He was probably appointed by the emperor Constantius preceptor to Julian, surnamed afterwards "The Apostate." Some writers, however, maintain that he introduced himself to that emperor at Nicomedia, either while he was pursuing his studies, or during his expedition into the East. Whichever account be true, it is certain he was a great favourite with Julian, and had such an influence over his mind, as to excite in him the most determined hatred to Christianity, while he inspired him with an ardent attachment and enthusiasm in favour of Heathen superstitions, and the practice of pretended magical arts. Such, at length, was the folly of the deluded emperor, that he seemed to place an entire confidence in the predictions of Maximus. When the emperor intended to make war against Persia, he had recourse to his divinations, which flattered him with the idea, that he was born to rival Alexander in the glory of conquest. The event shewed the vanity of the prophet, and the emperor fell a sacrifice to his credulity. During the reign of Jovian, Maximus was treated with respect; but under the government of Valentinian and Valens he was seized and prosecuted for the crime of magic, of which he was convicted and sentenced to a long imprisonment. In 373, he was put to death by the proconsul Festus, the distinguished minister of the emperor Valens' cruelties. Enfield. Hist. Phil.

MAXINO, in *Geography*, a town of Sweden, in the government of Wafa; 12 miles N.N.E. of Wafa.

MAXULA, MO-RAISAH, in *Ancient Geography*, an ancient town of Africa, situated on the sea-coast, S.E. of Carthage. It is mentioned by Ptolemy, Pliny, and Antonine in his Itinerary.

MAXY, in *Mineralogy*, a name given by some to mundic, a sulphureous mineral, common in the tin-mines of Cornwall, and elsewhere.

MAXYES, in *Ancient Geography*, a people of Africa, in Libya, W. of the river Triton. According to Herodotus, they permitted their hair to grow on the right side of the head, shaved the left side, and painted their bodies with vermilion. They are said to have been descended from the Trojans, and to have inhabited a very mountainous country, covered with wood and full of wild beasts.

MAY. MAIUS, the fifth month in the year, reckoning from our first, or January; and the third, counting the year to begin with March, as the Romans anciently did. It was called *Maius* by Romulus, in respect to the senators and nobles of his city, who were named *majores*, as the following month was called *Junius*, in honour of the youth of Rome, in *honorem juniorum*, who served him in the war; though some will have it to have been thus called from *Maius*, the mother of Mercury, to whom they offered sacrifice on the first day of it; and Papias derives it from *Madius*, *eo quod tunc terra madaat*.

In this month the sun enters Gemini, and the plants of the earth in general begin to flower.

The month of May was under the protection of Apollo; and in it also they kept the festival of Bona Dea, that of the goblins, called *lemuria*; and the ceremony of *regifugium*, or the expulsion of the kings.

The vulgar have a great opinion of the virtues of May-dew, and May-butter.

The month of May has ever been esteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage. The original reason may perhaps be referred to the feast of the Lemures,

mures,

mures, which was held in it. Ovid alludes to this in the fifth of his *Fasts*, when he says,

“Nec viduæ tædis eadem, nec virginis apta
Tempora; quæ nuptiæ, non diuturna fuit:
Hac quoque de causa, si te proverbia tangunt,
Mense malum Maio nubere vulgus ait.”

MAY-apple, in *Botany*. See *PODOPHYLLUM*.

MAY-bush. See *CRATÆGUS*.

MAY-dew. See *DEW*.

MAY-duke, a species of cherry.

MAY-lily. See *CONVALLARIA*.

MAY-weed. See *ANTHEMIS* and *MATRICARIA*.

MAY-weed, in *Agriculture*, the common name of a troublesome kind of field weed, which resembles wild chamomile, and is a trailing perennial plant, which puts out roots from its branches as they lie on the ground. By these means, and by scattering its seeds long before the corn is ripe, it spreads and multiplies greatly. It flowers in May, whence its name. With regard to the best means of extirpating it, they are those of summer fallowing, repeated good harrowing, and burning the collected roots. What escapes these clearings should be very carefully pulled up by hand; for the common weeding-hook will not go deep enough to take out the whole of the long slender tap root of this plant, of which every remaining bit that has a knot in it will produce new shoots. The farmer should not regret this small additional expence, to get rid of one of the most fatal enemies his corn can have. Mr. Lisle observes, that a “good crop of wheat in the winter time, was so destroyed by the coming up of May-weed and poppies in the spring and summer, that it did not at last yield so much as the seed.” Where proper tillage is practised, this can never be a case.

MAY-wort, in *Botany*. See *ARTEMISIA*.

MAY, THOMAS, in *Biography*, eldest son of sir Thomas May, knight, of Mayfield in *Sussex*, was born in 1595. He pursued his studies in *Sidney college*, *Cambridge*, where he took his degree of B.A.; after which he entered himself a member of *Gray’s Inn*, with the view of studying the law, though he probably never pursued it as a profession. He was much attached to literature, and became acquainted with the poets and men of wit who flourished in that period. Owing to the extravagance of his father, he had only a small annuity to depend upon. Some of his first compositions were of the dramatic class, and three tragedies and two comedies are extant in his name. He translated “*Virgil’s Georgics*,” “*Selected Epigrams of Martial*,” and “*Lucan’s Pharsalia*,” with a continuation of the poem to the death of *Julius Cæsar*, in seven books, of his own composition; which have been so much admired, as to be given with several of the best editions of *Lucan*. This has rendered his name famous among classical scholars. He was author of many original poems, such as “*The Reign of Henry II.*,” “*The victorious Reign of Edward III.*,” “*The Description of Henry II. with a short Survey of the Changes of his Reign*,” and “*The single and comparative Character of Henry and Richard his Sons*.” He was in high estimation with king *Charles I.*, who designated him as his poet; but the monarch was not sufficiently liberal to secure the poet’s attachment. He even quitted the royal party, upon the breaking out of the civil wars, and entered into the service of the parliament. He was appointed secretary to the parliament, and wrote a history of its transactions; which work became famous, and was extremely obnoxious to the royal party. *Clarendon* speaks with great contempt of his performance, but *Granger* affirms that it is a very respectable work. It was his last literary labour.

He died in November 1650. His consideration with his party was shewn by a splendid public funeral in *Westminster Abbey*, with a marble monument and a laudatory epitaph. After the restoration, the royalists took their revenge, dug up his body, which they treated with ignominy, and tore down the monument intended to perpetuate his fame. *Biog. Brit.*

MAY, in *Geography*, a river of America, in *South Carolina*, which runs into the Atlantic, N. lat. 32° 15'. W. long. 80° 55'.—Also, a river of *Chiampa*, which runs into the *Chinese sea*, N. lat. 10° 42'. E. long. 107° 14'.—Also, a town of *Persia*, in the province of *Farsistan*; 120 miles S. of *Schiras*.—Also, a small island of *Scotland*, at the entrance of the *Firth of Forth*, formerly dedicated to *St. Adrian*, who was murdered by the *Danes*. On it is a light-house; five miles S. of *Fifeness*. N. lat. 56° 10'. W. long. 2° 38'.

MAY. See *MAYO*.

MAY, Cape, the most southerly point of land of *New Jersey*, and the N. point of the entrance into *Delaware bay* and river in N. lat. 39°. W. long. 74° 51'.

MAY, Cape, County, extends northward round the fore-mentioned cape, and is a healthy, sandy tract of country, 34 miles long, and 19 broad. This county is divided into *Upper, Middle, and Lower precincts*. The number of inhabitants is 3066, of whom 98 are slaves.

MAY Point, a point of the peninsula, between *Fortune* and *Placentia bays*, on the S. side of *Newfoundland island*.

MAYA, a town of *Spain*, in *Navarre*; 21 miles N. of *Pamplona*.

MAYA, in *Metaphysics*, is a term of vague import among the *Brahmans* and other *Hindoo philosophers*. It means *illusion* or *deception*, and is variously applied in cases beyond the reach of demonstration or comprehension. For instance, although their most sacred books give the title of god to the sun, and they confess generally that the sun is an emblem or image of their three great deities, jointly and individually, that is of *Brahm*, or the *Supreme Being*, who alone exists really and absolutely, yet the *three forms*, or *trimurti*, are considered as *maya*, or *delusion*, as well as the body of the sun; but since the latter is the most glorious and active emblem of *God*, that luminary is respected as an object of high veneration. This is sufficiently mysterious; but it flows from the principal tenet of the *Vedanti school* (see *VEDANTA*): “That the only being which has absolute and real existence is the *Divine Spirit*, infinitely wise, infinitely benign, and infinitely powerful, expanded through the universe; not merely as the *soul of the world*, but as the ruler of it, sending forth rays or emanations from his own essence, which are the pure vital souls of all animated creatures, whether *moveable* or *immoveable*; or, as we should express it, both *animals* and *vegetables*, and which he calls back to himself, according to certain laws established by his unlimited wisdom.” *Brahm*, as the *Molt High One*, is neuter; in the character of *Supreme Ruler* he is named *Parameßwara*; but, through the infinite veneration to which he is entitled, the *Hindoos* meditate on him with silent adoration, and offer prayers and sacrifices only to the higher emanations from him. This silent adoration is by some called *Jap*, (see that article,) in which description of worship the holy *gayatri* and the sacred monosyllable *O’M* is mentally recited. (See *O’M*.) In a mode, incomprehensible to inferior creatures, they are involved at first in the gloom of *maya*, and subject to various taints from attachment to worldly affections; but they can never be reunited to their source, until they dispel the illusion by self-denial, renunciation of the world, and intellectual abstraction, and have removed the impurities of their nature

by repentance, mortification, and successive transmigratory passages through the forms of animals or vegetables, according to their demerits. In such a reunion consists their final beatitude; and to effect it by the best possible means is the object of their supreme ruler, who, in order to reclaim the vicious, to punish the incorrigible, to protect the oppressed, to destroy the oppressor, to encourage and reward the good, and to shew all spirits the path to their ultimate happiness, has been pleased (say the Brahmans) to manifest himself in a variety of ways, from age to age, in all parts of the habitable world. When he acts immediately without assuming a shape, or sending forth a new emanation; or when a divine sound is heard from the sky, that manifestation of himself is called *Akashvani*, or an ethereal voice: when the sound proceeds from a meteor, or a flame, it is said to be *Agnipuri*, or formed of fire: a descent of the deity in the shape of a mortal, is an *avatara*. Of this last description there have been many; but the chief of them as detailed in the Puranas, and to which the word is generally applied, are the ten, or *dashavatara*, of Vishnu; as enumerated under the article *VISHNU*, and described briefly under the references therefrom. A similar incarnation of an inferior kind, intended to answer some purpose of self-moment, is called *Avantara*. Of this description is that noticed under *KANDEU RAO*; though in common language called also *avatara*. The supreme being, and the celestial emanations from him, are *nirakara*, or bodiless, in which state they must be invisible to mortals; but when they are *pratyaksha*, or visible, they become *sakara*, or embodied, and expressive of the divine attributes; thus Krishna revealed himself to Arjun, as described in an extract from the Gita under the article *KRISHNA*, or in a human form, which Krishna usually bore. And in that mode of appearing, the deities are generally supposed to be born of a woman, but without any carnal intercourse. The excessive libertinism of Krishna, his sectaries declare to be apparent only; he was chaste and pure in reality; such appearances were *maya*, or delusion.

These doctrines, however, are by no means received by all Hindoos, though they be very popular with certain sects. A reformation of the above, called *Purva mimansa*, was introduced by Jaimini, who denies the incarnations of deities. See *JAIMINI*.

Although not particularly in its place, we will here insert four verses translated by sir William Jones from the Bhagavat, one of the Hindoo Puranas, as connecting some of their philosophical tenets. The translation we are assured is "most scrupulously literal."

"Even I was at first, not any other thing; that which exists unperceived, supreme; afterwards *I am that which is*; and he who must remain, am I.

"Except the *First Cause*, whatever may appear, and may not appear, in the mind, know that to be the mind's *maya*, or delusion, as light, as darkness.

"As the great elements are in various beings, entering, yet not entering, (that is, pervading, not destroying,) thus am I in them, yet not in them.

"Even thus far may enquiry be made by him who seeks to know the principle of mind, in union and separation, which must be *every where always*." Asiatic Ref. vol. i.

The above verses are stated to have been spoken by the supreme being to Brahma, and wild and obscure as they are, the learned translator doubts if the poetry or mythology of Greece and Italy afford conceptions more awfully magnificent; the brevity and simplicity of the Mosaic diction is, however, unrivalled.

The first of the four verses above quoted will strongly re-
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mind the reader of the inscription in a temple at Basa in Lower Egypt; see the article *EGYPT*, where further traces of resemblance will be found between the theology and philosophy of that country and of India, as exhibited in this, and the other articles connected with Hindoo mythology.

"As the soul of the world, or the pervading mind, so finely described by Virgil, we see Jove represented by several Roman poets; and with great sublimity by Lucan, in the speech of Cato concerning the Ammonian oracle: "Jupiter is wherever we look, wherever we move." This is precisely the Indian idea of Vishnu, according to the four verses above exhibited—not that the Brahmans imagine their male divinity to be the *divine essence* of the Great One, which they declare to be wholly incomprehensible; but, since the power of *pervading* created things, by a superintending providence, belongs eminently to the Godhead, they hold that power to exist transcendently in the preserving member of the Triad, whom they suppose to be *every where always*, not in subsistence, but in spirit and energy. Here, however I speak of the Vaishnavas, for the Saivas ascribe a sort, of pre-eminence to Siva." Jones, ib. See *VAISHNAVA* and *SAIVA*.

The accomplished writer above quoted addressed a spirited hymn to Narayana, and in the argument prefixed says, "that a complete introduction to it would be no less than a full comment on the Vedas and Puranas of the Hindoos, the remains of Egyptian and Persian theology, and the tenets of the Ionic and Italic schools: but this is not the place for so vast a disquisition. It will be sufficient here to notice, that the inextricable difficulties attending the *vulgar notion of material substances*, concerning which 'we know this only, that we nothing know,' induced many of the wisest among the ancients, and some of the most intelligent among the moderns, to believe that the whole creation was rather an *energy* than a *work*, by which the infinite Being, who is present at all times in all places, exhibits to the minds of his creatures a set of perceptions like a wonderful picture, or piece of music, always varied, yet always uniform; so that all bodies and their qualities exist, indeed, to every wise and useful purpose, but exist only as they are *perceived*: a theory no less pious than sublime, and as different from any principle of atheism as the brightest sunshine differs from the blackest night. This *illusory operation* of the Deity the Hindoo philosophers call *maya*, or *deception*." The Berkelyan theory of immaterialism seems to coincide with these doctrines. See *BERKELEY*.

Maya, in a more mythological view, is described as the mother of Kama, the god of love. Under this personification she represents the general *attracting* power; and some Hindoo scholars explain the word to mean the 'first inclination of the Godhead to diversify himself,' such is their phrase, 'by creating worlds.' She is thus dignified to be the mother of universal nature and of all the inferior gods. Lakshmi, the bounteous giver of all good, is also represented to be the mother of Kama, and one of her appellations is *Maya*, or *Ada-maya*, as noticed under *LAKSHMI*.

MAYA, in *Ornithology*, a name given by the people of the Philippine islands to a small species of sparrow, much less than our's, and very common among them. It feeds on rice, and is very destructive of it.

MAYACA, in *Botany*, a name of which no explanation is given. Anbl. Guian. 42. t. 15. Juss. 45. Lamarck Illustr. t. 36. Michaux Boreal-Amer. v. 1. 20. See *SYENA*; Schreb. 36. Willd. Sp. Pl. v. 1. 254.

MAYACARI, in *Geography*, a river of Guiana, which runs into the Atlantic, N. lat. 2° 11'. W. long. 51° 46'.
F
MAYA.

MAYAGUANA, one of the Bahama islands; 24 miles in length. N. lat. $22^{\circ} 32'$ to $22^{\circ} 44'$. W. long. $72^{\circ} 15'$ to $72^{\circ} 30'$.

MAYAHOUN, a town of the Birman empire, on the Irawaddy, which formerly belonged to Pegu, and was called "Loonzey" or "Lundsey." It is large, and contains many temples and convents, besides granaries filled with rice, produced in the environs, and belonging to the king; 120 miles N.N.W. of Rangoon.

MAYALS, a town of Spain, in Catalonia; 16 miles S. of Lerida.

MAYAMBA, a town of Africa, and capital of a province of the same name, in the kingdom of Loango, near the Atlantic ocean. Within its territory, which extends far eastward, is a salt lake, above 15 miles in compass, which empties itself by some rivulets into the sea, about half a league N. of cape Negro. The town stretches along the coast, but lies so low that the inhabitants are frequently under a necessity of removing at high water to some of the neighbouring high lands. The river Banna, which runs near the town, is saltish, and has at its mouth a good fishery for oysters. By means of this river, logwood is brought to the port in canoes from the province of Sette, where it abounds; the river extends 150 miles within land. The soil of Mayamba is dry and sandy, and produces little or no grain, but furnishes plenty of bananas and palm-trees, and of the latter a wine is made, and also roots of maxondo, which they use instead of bread. The lakes and rivers supply abundance of fish, on which the inhabitants chiefly subsist. The oysters are opened and smoked, and are thus preserved in an eatable state for several months. The country abounds with game, which is caught by dogs, with wooden clappers to their necks, by the noise of which they follow them, as they are not able to bark. The government of this province is commonly conferred on a counsellor of state, who is also prince of Loangiri, and gives no account to the king of Loango of any commodities, except of the logwood, which pays a duty of 10 per cent. The people are rude and savage, and their governor is an absolute tyrant. The commerce of elephants was formerly considerable and lucrative, but has lately been almost annihilated. S. lat. $3^{\circ} 20'$. E. long. $13^{\circ} 4'$.

MAYAPARA, the proper name of Point Palmiras; which see.

MAYAPIL, a town of Mexico, in New Biscay; 75 miles S.S.E. of Parral.

MAYAPOUR, a town of Bengal; eight miles S.W. of Palamow.—Also, a town of Bengal; 12 miles S.W. of Calcutta.

MAYAR, a town of Persia, in the province of Irak, containing about 300 houses, and a caravanfera; 24 miles S. of Ispahan.

MAYASQUER, a town of South America, in the audience of Quito; 70 miles N. of Quito.

MAYBACA, a river of Guiana, which runs into the Atlantic, N. lat. $6^{\circ} 40'$. W. long. $58^{\circ} 26'$.

MAYBOLE, or MINNEBOIL, a town of Scotland, in the county of Ayr, which has manufactures of woollen and cotton. The population returned to parliament in 1791 was 3162, of whom 1626 were employed in manufactures, chiefly of blankets. At this time here were ten persons, whose ages amounted together to upwards of 900 years; 18 miles S. of Ayr.

MAYCAWINI, a river of Guiana, which runs into the Atlantic, N. lat. $6^{\circ} 35'$. W. long. $58^{\circ} 26'$.

MAYCOCK BAY, a bay on the W. coast of Barbadoes; three miles N. of Speight's town.

MAYDOOH, a town of the Birman empire; 42 miles S.W. of Monchaboo.

MAYEM, a town of Hindoostan, in Baglana; 20 miles N. of Basseen.

MAYEN, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Coblentz; 15 miles W. of Coblentz. The place contains 2200, and the canton 5358 inhabitants, in 15 communes N. lat. $50^{\circ} 26'$. E. long. $7^{\circ} 8'$.

MAYEN'S *Island*, an island lying S.W. of Spitzbergen; formerly resorted to for the whales which frequented its coast, but now forsaken, as these fishes have removed farther north. A very high mountain, called Beerenbergen, or Bear mountain, extends quite across the island, which may be seen from the sea, at the distance of 30 miles. This island has many good bays, and the land abounding with deer, and the coast with fish, render it habitable; but the floats of ice, towards the E. especially, make it inaccessible in spring. N. lat. $71^{\circ} 13'$.

MAYENCE. See MENTZ.

MAYENNE, CHARLES of Lorraine, Duke of, in *Biography*, second son of Francis of Lorraine, duke of Guise, was born in 1554. He displayed great courage at the sieges of Poitiers and Rochelle, and at the battle of Montcontour. He also defeated the Protestants in Guienne, Dauphiny, and Saintonge. When his brothers were killed at the meeting of the Estates at Blois, he declared himself head of the league, and assumed the title of lieutenant-general of France. He proclaimed the cardinal of Bourbon king, by the name of Charles X.; but was defeated by Henry IV. at the battle of Arques, and again at Ivry. In 1599 he was reconciled to the king, who made him governor of the Isle of France. He died in 1611. Moreri.

MAYENNE, in *Geography*, a town of France, and capital of a department of the same name, and principal place of a district, near the river Mayenne, defended by a castle on a rock: the river rises near Linieres in the department of the Charente, and passing by Ambrieres, Mayenne, Laval, &c. joins the Sarthe, about three miles N. from Angers, and forms the Mayne, which joins the Loire, about four miles below. The town contains 7575 inhabitants; one of its cantons contains 14,834, on a territory of 162½ kilometres, in eight communes, and the other contains 14,946 inhabitants, on a territory of 200 kilometres, in twelve communes.

MAYENNE, one of the nine departments of the N.W. region of France, formerly Lower Maine, lies in N. lat. $48^{\circ} 15'$, and is bounded on the N. by the departments of the Channel and the Orne, on the E. by the department of the Sarthe, on the S. by the Mayne and Loire, and on the W. by that of the Ille and Vilaine. Its length is about 22 French leagues, and breadth 16; its extent is 5452½ kilometres, or about 266 square leagues, and the number of its inhabitants is computed at 328,397. It is divided into three circles, 27 cantons, and 288 communes. Its circles are Mayenne, including 157,256 inhabitants in 116 communes; Laval, containing 106,141 inhabitants in 93 communes; and Chateau-Gonthier, having 65,000 inhabitants in 79 communes. According to M. Hassenfratz, this department comprehends seven circles, 68 cantons, and 323,607 inhabitants. Its contributions in the 11th year of the French era amounted to 3,111,618 fr., and its expences for administration, justice, and public instruction, were 234,804 fr. Its capital is Laval. A great proportion of this department is hilly and covered with forests; it has many sandy tracts, and few cultivated plains. The borders of the rivers Sarthe and Mayenne yield some grain, fruits, and pastures in abundance.

Here are mines of iron, quarries of marble and stone, mineral springs, &c.

MAYENNE, or MAYNE, and *Loire*, so called from the union of two rivers, formerly Anjou, is one of the nine departments of the western region of France, lying in N. lat. 47° 20', and bounded on the N. by the departments of the Mayenne and Sarthe; on the E. by the department of the Indre and Loire; on the S. by the departments of the Vendée, the Two Sevres, and the Vienne; and on the W. by the department of the Lower Loire. Its length is 26 French leagues, and breadth 21 leagues; and its territorial extent is 70,37½ kilionetres, or about 370 square leagues; and its number of inhabitants is 376,033. It is divided into five circles or districts, 34 cantons, and 385 communes. The circles are Segré, comprehending 58,176 inhabitant in 77 communes; Baugé, including 60,669 in 61 communes; Saumur, having 90,104 in 115 communes; Beaupreau, with 74,657 in 73 communes; and Angers, having 92,434 in 59 communes. According to M. Hassenfratz, the circles are eight, the cantons 99, and the number of inhabitants 445,500. Its contributions in the 11th year of the French era amounted to 4,182,024 fr. and its expences for administration, justice, and public instruction, were 348,331 fr. 99 cents. Its capital is Angers. This department, diversified with hills and plains, yields grain, flax, hemp, fruits, abundant pastures, considerable forests, mines of coal, &c. and quarries of marble, stone, and slate.

MAYEPEA, in *Botany*. See CERANTHUS, and CHIRONANTHUS *Incrassata*. Notwithstanding the doubts of our learned predecessor in the place last cited, we are convinced that this genus of Aublet and Schreber is rightly referred by Swartz and Vahl to *Chionanthus*, and that Jussieu was widely mistaken in ranking it among his *Rhamnii*.

MAYER, JOHN FREDERIC, in *Biography*, a learned German divine in the seventeenth century, was born at Leiplic in 1650; he acquired a profound knowledge of the ancient languages, and became professor at several of the universities of his country. He died in 1712 with a high character for learning. He was author of "Bibliotheca Biblica," which treats of the most celebrated commentators of the scriptures; a treatise "On the best Method of studying the Sacred Scriptures;" "The History of Martin Luther's German Version of the Bible, with a short Account of the Translations of the Sacred Books before his Time;" and other pieces. Moreri.

MAYER, TOBIAS, a German astronomer and mechanic, was born at Marpach, in Wirtemberg, in the year 1723. At the very early age of four years he shewed a strong attachment to the mechanical arts, and actually began to design and construct little machiæ with dexterity and accuracy. His father was a civil engineer, and encouraged him in his pursuits; but upon his death the son was left almost destitute, and was obliged to depend on his own energies for future support. By these he made himself acquainted with mathematical learning, and qualified himself in a short period to be an able instructor of others. He acquired, at the same time, a considerable share of classical knowledge, so as to be able to write the Latin tongue with elegance. At the age of twenty-eight, he was nominated mathematical professor at the university of Gottingen, and soon after was admitted a member of the Royal Society in that town. From this time every year of his life was distinguished by discoveries in geometry or astronomy. He invented many useful instruments for the measurement of angles: he applied himself to study the theory of the moon: he extended his observations to the planet Mars, and the fixed stars, determining the places of the latter, and ascer-

taining that they possess a certain degree of motion relative to their respective systems. Towards the close of his short life the magnetic needle engaged his attention, to which he assigned more certain laws than those before received. To all his pursuits he applied with such indefatigable assiduity, that he died literally worn out with labour in 1762, at the age of thirty-nine. The principal works which he gave to the public were, "A New and General Method of resolving all geometrical Problems, by means of geometrical Lines;" "A mathematical Atlas, in which all the mathematical Sciences are comprised in sixty Tables;" "A Description of a Lunar Globe, constructed by the Cosmographical Society of Nuremberg, from New Observations;" "Miscellanea;" and several valuable papers in the Memoirs of the Royal Society of Gottingen. His table of refraction, deduced from astronomical observations, agrees with that of Dr. Bradley; and his theory of the moon, and astronomical tables and precepts, were so well received, that they were rewarded by the English Board of Longitude with the premium of three thousand pounds, which sum was paid to his widow after his decease. These tables and precepts were published in 1770.

MAYERGA, in *Geography*, a town of Spain, in the province of Leon; 23 miles S. S. E. of Leon.

MAYERNE, Sir THEODORE TURQUET DE, BARON D'AUBONNE, in *Biography*, an eminent physician, was born at Geneva in the year 1573. His father, Lewis de Mayerne, author of "A General History of Spain," and of "The Monarchie arillo-democratique," and a Calvinist, had removed thither the preceding year, on account of religious persecution, from Lyons. After being instructed in the rudiments of literature in his native city, Theodore was sent to the university of Heidelberg, where he remained some years; after which, as he had made choice of the profession of medicine, he removed to Montpellier, where he received the degree of doctor in 1597. He then went to Paris, where he became acquainted with Riverius, first physician to king Henry IV., through whose influence he was, in the year 1600, appointed to attend the duke de Rohan, as physician, in his embassy to the diet at Spire; and also nominated one of the physicians in ordinary to the king. On his return, he availed himself of the privilege which the latter office afforded him, and practised in the metropolis, where he also gave public lectures in anatomy and in pharmacy to the young surgeons and apothecaries. The latter of these subjects led him to treat of chemistry, to the practice of which he had paid peculiar attention; and his recommendation of chemical remedies drew upon him a considerable degree of enmity from the faculty of Paris, who manifested their attachment to Galen, by an indiscriminate abuse of all who ventured to employ any mode of treatment not mentioned in his works. Quercetanus was joined with Mayerne in this attack; and one of the faculty, in 1603, published a book against these heterodox brethren, entitled "Apologia pro Hippocratis et Galeni Medicina, contra Mayerneum et Quercetanum." To this Mayerne replied immediately in another "Apologia, in qua videtur, inviolatis Hippocratis et Galeni legibus, Remedia chemicè præparata tuto usurpari posse," in which he made some severe strictures on the Parisian physicians. The Galenists, however, not only replied, but proceeded to issue a decree of the faculty against consulting with him, conceived in very bitter and abusive terms. But the esteem of Henry IV., which he had fully obtained, so far supported him, that he continued to practise in Paris, and would have been appointed first physician to the king, provided he would have embraced the Catholic religion. Even in spite of his unyielding adherence

to Protestantism, the king would have given him that appointment, had not the Jesuits influenced queen Mary de Medicis to interpose and prevent it. In 1607, an Englishman of rank, who had been his patient, carried him over to England, and introduced him to the royal family. He returned to Paris, and remained there till after the assassination of Henry IV., which took place in May, 1610. In the following year, he received an express invitation from king James I. to come and take the office of his first physician, which he accepted, and passed the rest of his life in England, where he appears to have been considered as the first person in the profession. He was admitted to the degree of doctor in both universities, and into the College of Physicians, and treated with the greatest respect by these learned bodies. He incurred some obloquy on account of the fatal sickness of Henry prince of Wales, in October 1612; in the treatment of which he differed in opinion from the other physicians, with respect to the use of blood-letting. But his conduct obtained the approbation of the king and council, of which certificates, couched in the most satisfactory terms, were given him. He received the honour of knighthood from James, in 1624; and on the accession of Charles I. he was appointed first physician to him and his queen, and rose to high favour, particularly with the latter. During the civil commotions he still adhered to the royal party, for he was appointed first physician to Charles II. after the death of his father, although the office was now merely nominal. Thus he enjoyed the extraordinary honour of serving four kings successively in his medical capacity; and during all this period he was most extensively employed by persons of the first rank in this kingdom, by which he accumulated a large fortune. He died at Chelsea, March 15, 1655, in the eighty-second year of his age, and was buried in the church of St. Martin's-in-the-Fields. Sir Theodore was twice married; but left only one daughter, who was married to the marquis de Cugnac, grandson of marshal de la Force. He bequeathed his library to the College of Physicians.

The only work which sir Theodore Mayerne published himself, was the "Apologia," before-mentioned. But in Germany a letter of his was printed in 1619, "De Gonorrhæa inveteratæ, et Carunculæ et Ulceris in meatu urinario curatione ad Geo. Mat. Koningium." After his death were published "Medical Counsels and Advices," and "A Treatise on the Gout," which had been written in French, translated into Latin by Theoph. Bonetus, and thence into English by Dr. Thomas Sherley, in 1676. Also, "Præxeos Mayernianæ in Morbis internis gravioribus et chronicis Syntagma," published in 1690, by his godson, sir Theodore de Vaux, who also communicated to the Royal Society, in 1687, "Mayerne's Account of the Diseases of Dogs, with several Receipts for Canine Madness," printed in the Philosophical Transactions for that year. "Tractatus de cura Gravidarum," added to an edition of the "Praxis." Most of these were included in Dr. Joseph Browne's publication, entitled "Mayernei Opera Medica, complectentia Consulta, Epistolæ, et Observaciones, Pharmacopœiam variasque Medicamentorum formulas," folio, 1701. The first book in this volume consists of medical cases treated by the author, to most of which the names of the patients are prefixed, who are in general persons of the first quality in France and England. They comprehend a series from 1605 to 1640. The descriptions are generally distinct, minute, and judicious, and the reasonings, though commonly founded upon the erroneous doctrines of that time, are yet acute and learned. His prescriptions are mostly of the compound form of the Galenic school; yet his Pharmacopœia exhibits a number

of chemical preparations, and he, doubtless, contributed much to their introduction. Nor did he confine his chemical knowledge to medicinal subjects; for he is said to have discovered, by a course of experiments, the principal colours to be used in enamelling, and to have communicated them to Petitot, the famous painter in that branch. He was, likewise, conversant with natural history, and edited Mouffet's posthumous "Theatrum Insectorum." Aikin's Biog. Memoirs of Med. Gen. Biog.

MAYET, in *Geography*, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of La Flèche; 15 miles S. of Le Mans. The place contains 3165, and the canton 10,049 inhabitants, on a territory of 210 kilometres, in seven communes.

MAYET-de-Montagne, *Le*, a town of France, in the department of the Allier, and chief place of a canton, in the district of La Palisse; 10 miles S.E. of Cusset. The place contains 3945, and the canton 14,443 inhabitants, on a territory of 180 kilometres, in 12 communes.

MAYETA, in *Botany*, Aubl. Guian. 443. t. 176. Juss. 330; is *Melastoma Maïeta*, Lamarck Dict. v. 4. 34. Willd. Sp. Pl. v. 2. 589. See MELASTOMA.

MAYFIELD, in *Geography*, a township of America, in Montgomery county, New York, incorporated in 1793, and containing 876 inhabitants.

MAYHEM. See MAHIM.

MAYHEM, *Appeal of*. See APPEAL.

MAYL, in *Falconry*, signifies to pinion the wings of a hawk.

MAYLLO, in *Geography*, a town of Spain, in the province of Leon; 14 miles E.S.E. of Ciudad Rodrigo.

MAYNA, in *Botany*, (why so called does not appear,) Aubl. Guian. 921. t. 352, a diœcious shrub, of which the male only was observed in Cayenne by Aublet. He describes it by the name of *M. odorata*, as having several upright, simple, flexible, brittle stems, about six feet high. Leaves alternate, stalked, ten inches long, and three wide, lanceolate inclining to obovate, pointed, entire, somewhat wavy, of a fine shining green, and a firm texture, with a prominent rib and numerous veins beneath. Stipules lanceolate, deciduous. Flowers axillary, several together, on short stalks, white, and very agreeably scented, produced in the month of December. The calyx is in three deep concave segments, externally hairy. Petals eight, roundish, with short erect claws. Stamens 28 or 30, disposed upon a conical receptacle; their filaments short, anthers long and quadrangular, opening at the top. Aublet could find no traces of a pistil, nor could he discover the female plant, though he carefully sought for it. Jussieu has justly referred this genus to his order of *Magnoliæ*; see that article.

MAYNARD, FRANCIS, in *Biography*, a French poet, born in 1582, was son of a counsellor in the parliament of Toulouse. He was introduced, while very young, to court, and was appointed secretary to queen Margaret. In 1634, the duke de Noailles, being appointed ambassador to the court of Rome, took Maynard with him. He was member of the French Academy from its first institution, and endeavoured to ingratiate himself with the cardinal Richelieu, but failing in his object, he gave him the appellation of tyrant, and wrote satires upon him. At length, weary in the pursuit of fortune, he retired to his native province, where he died in 1646, at the age of sixty-four. His works consist of Songs, Epigrams, Odes, Miscellaneous Poems, and Letters in prose. They must be read with caution, for though esteemed as a man of honour and a sincere friend, his principles were very licentious. Moreri.

MAYNARD,

MAYNARD, Sir JOHN, an eminent English lawyer, who distinguished himself by his patriotism, as well as his knowledge of jurisprudence, and integrity in his profession. When the prince of Orange was declared king after the abdication of James II., Sir John waited upon the new monarch with an address; and William having observed to him that from his age he must have outlived most of the judges and eminent lawyers of his standing; he replied, "and I should have outlived the law too had it not been for the arrival of your majesty." He died in 1690, aged 88. *Biog. Brit.*

MAYNAS, in *Geography*, a government of South America, in the eastern limit of the audience of Quito, lying contiguous to those of Quixos and Jaen de Bracamoros towards the east. In the territories of this jurisdiction are the sources of those rivers, which form by their conflux the Marañon. The streams of these rivers environ and pervade the government of Maynas. Its limits, both towards the N. and S., are little known. Eastward it joins the possessions of the Portuguese, from which it is separated by the line of demarcation that forms a boundary between the Spanish and Portuguese possessions. Santiago de la Laguna, which is the residence of the governor, is properly the capital of Maynas; though San Francisco de Borja has been usually considered as such. (See *COCAMA*.) The missionary villages of this jurisdiction are numerous; and they trade with each other, and also with Quito and Lamas, in salted fish, chocolate, of which the arroba (25 lbs.) is sold for two rials, wax, yuca, and vegetable candles, called by the natives "pallas," being the fruit of a tree, which, when lighted, presents at once wax and wick. Whether this tree be the "croton sebifera" of Linnæus has not been ascertained. There are also some poor manufactures, chiefly cloaks and hats, made of the rich plumage of the birds, with which they are formed after any pattern. The manners and customs of the inhabitants of Maynas differ little from the other nations of the Pampas del Sacramento, except where they are tinged with a faint dye of Christianity.

MAYNBERNHEIM, a town of Germany, in the margraviate of Anspach, near the Maine; 12 miles S.E. of Wurzburg.

MAYNE. See *MAYENNE*.

MAYNE, a river of Ireland, in the county of Antrim, which, rising towards the centre of the county, flows into Lough Neagh, a little below Randalstown.

MAYNOOTH, a post-town of Ireland, in the county of Kildare, and province of Leinster. In this town is the Royal College of St. Patrick, for the education of persons professing the Roman Catholic religion, instituted by act of parliament in the year 1795. The building consists of lodging-rooms, schools, a church, library, hall, and different offices suitable to the accommodation of 200 ecclesiastical students, besides professors, officers, and servants. There is also a Lay College, established by private subscription in 1802. When the evils attendant on a foreign education, especially under the circumstances in which the Roman Catholic clergy of Ireland were educated. At the expence of foreign powers, are considered, it must be admitted to have been a wise step in the parliament of Ireland to provide a place of education for them at home; and it is surprising that the expence thus incurred should ever be objected to by Protestants. The question is not, whether the tenets of popery are deserving of support? but whether the population of Ireland is to be supplied with priests educated at the expence, and of course attached to the interest, of foreign powers, or supplied with them from a college supported at the national expence? Maynooth had formerly a college, founded in

1518 by an earl of Kildare, whose descendant, the duke of Leinster, has a princely residence in the neighbourhood. It has also a charter-school for fifty girls. Maynooth is 12 miles W. by N. from Dublin.

MAYO, a county of Ireland, in the province of Connaught, the third in size, but one of the least populous in proportion to its extent. It is bounded on the N. and W. by the Atlantic ocean, on the E. by Sligo and Roscommon, and on the S. by Galway. Its length, from N. to S., is 49 Irish or 62 English miles; and its breadth 45 Irish or 57 English miles. It contains 790,600 acres, or 1235 square miles Irish, equal to 1,270,144 acres, or 1984 square miles English. Its population was estimated, when Dr. Beaufort wrote, at 140,000, but there must have been since that time a considerable increase in this as well as every other county. There are 68 parishes, but these are combined into eighteen benefices, having about as many churches, which would be a dreadful grievance, if the great mass of the people were not Roman Catholics. The soil of the county of Mayo varies prodigiously, from the bleak and rugged mountain to the fertile and cheerful plain. The eastern and southern parts are arable and champaign, and though not arrived at a high degree of cultivation, they produce a sufficiency of corn and flax for home consumption, and supply other counties with abundance of fat and store cattle. In the mountainous district of Burischoole there are some fruitful grounds along the coast and in the vallies. But a large extent in the N.W. is overspread with an immense mass of uninhabited mountains, and trackless bogs without roads, and very difficult of access to the few farmers and fishermen who dwell upon the coast, and to the inhabitants of the Mullet; a peninsula, which is said to be fertile, pleasant, and well inhabited. Among the mountains in the S.W. Croagh-Patrick claims the pre-eminence, the conic summit of which is distinguished at a vast distance rising 2666 feet above the level of the sea, and being by some esteemed the highest mountain in Ireland, but others consider the Reeks in Kerry to surpass it. On the top of Croagh-Patrick is a very large and remarkable cairn. M'Nephin, though little inferior to it in height and sublimity, being 2640 feet high, is of a very different character, for it stands almost insulated, and appears rounded on all sides, and at top like a huge rath or barrow. There are, in the flat country that borders upon the lakes of Mask and Carrah, many miles of rocky ground, which, at a distance, appear like one immense sheet of white stone. But upon a nearer inspection of these singular rocks, they are perceived to stand in parallel lines, from one to three feet above the surface, like flag-stones pitched in the ground upon their edges; and however they may vary in shape, size, and distance, they are all calcareous, and have all the same direction. Fissures of a great depth are found in some of the narrowest interstices; but, in general, the verdure between them is beautiful, and the pasture excellent for sheep. Large caverns and subterraneous waters are also frequent in this part of the country, especially near Cong. At the back of that small village, a very broad river rushes at once from beneath a gently-sloping bank, and after a rapid course of about a mile, loses itself in lough Corrib. It is supposed to be the outlet of a subterraneous channel, through which the superfluous waters of lough Mask and lough Carra are discharged into Corrib. This rocky part of Mayo abounds also with *turlachs*, as they are called in Irish. These are plains, some of them very extensive, which having no visible communication with any brooks or rivers, in the winter are covered with water, and become in the summer a rich and firm pasture, the waters rising and retiring through
rocky

rocky clefts in the bottoms. There are many fine lakes in this county. Lough Conn, at the foot of M'Nephin, is nine miles long; Lough Mask is longer by two miles, and considerably broader. There are some fine harbours, and many islands, the most remarkable of which are noticed in distinct articles. Castlebar is the county town. The only members of parliament returned from this county are the two knights of the shire. Beaufort's Memoir.

MAYO, or *May*, one of the Cape de Verd islands, about 21 miles in circumference, of an oval form, with a variety of rocks and points projecting into the sea. Its elevation above the sea is considerable; nevertheless its surface is level and plain, if we except two mountains of considerable height. The shore, according to the description of Dampier, presents sandy bays between the promontories, which afford good anchorage. On the W. side of the island, are a bay of this kind, where ships drop anchor, and a sand bank, forty paces wide, and extending nearly three miles along the shore, within which is a large salt pond, two miles long, and half a mile broad, from the N. end of which salt is obtained in the whole dry season, that is, from November to the month of May. The soil of the island is dry, with little moisture from rivulets or springs, its humidity being occasioned by the nightly dews, or the showers that fall in the wet season. In the whole island there is only one spring, near its centre, the water of which runs off in a small stream through a valley confined by the hills. The island of course must be in a very considerable degree barren and unproductive. It has three small towns, which contain all the inhabitants of the island. The chief fruits are figs, watermelons, citrons and oranges of a very indifferent quality, and pumpions, which, together with calwanas, a sort of bean, furnish the natives with their ordinary diet. The sea supplies great variety and plenty of fish. The number of inhabitants is estimated at 7000. N. lat. $15^{\circ} 10'$. W. long. $23^{\circ} 8'$.

MAYO, a river of New Mexico, which runs into the gulf of California, N. lat. $27^{\circ} 40'$.—Also, a town of South America, in the government of Caraccas; 35 miles W. of Caraccas.—Also, a province of New Mexico, bounded on the N. by the province of Hiscui, on the E. by New Biscay, on the S. by Cinaloa, and on the W. by the gulf of California.

MAYOBAMBA, a town of Peru, in the diocese of Truxillo. S. lat. $6^{\circ} 58'$.

MAYOMBA, or JAMBO, a town of Africa, in Loango, on the coast. S. lat. $3^{\circ} 45'$. E. long. $10^{\circ} 24'$.

MAYOMBO, a town of Congo; eight miles S.S.W. of Bombi.

MAYOR, a small island in the South Pacific ocean, near the coast of New Zealand. S. lat. $36^{\circ} 57'$. E. long. $183^{\circ} 31'$. Near this is a cluster of small islands and rocks, to which Cook gave the name of "The Court of Aldermen."

MAYOR, *Cape*, a cape on the N. coast of Spain. N. lat. $43^{\circ} 29'$. W. long. $3^{\circ} 46'$.

MAYOR, or *Mayor*, the chief magistrate or governor in the cities, and most corporation towns of England; chosen annually by his peers out of the number of the aldermen. See ALDERMAN.

The word, according to Verstegan, comes from the ancient English *maier*, *able*, *potent*, of the verb *may*, or *can*. The mayor of the place is the king's lieutenant, and, with the aldermen and common-council, can make laws, called *bye-laws*, for the government of the place. He has also the authority of a kind of judge, to determine matters, and to mitigate the rigour of the law.

King Richard I., A.D. 1189, first changed the bailiffs of London into mayors; by whose example others were afterwards appointed. See LONDON.

Mayors of corporations are justices of peace *pro tempore*, and they are mentioned in several statutes; but no person shall bear any office of magistracy concerning the government of any town, corporation, &c. that hath not received the sacrament, according to the church of England, within one year before his election; and who shall not take the oaths of supremacy, &c. stat. 13 Car. II. cap. i.

MAYOR'S-COURT. See COURT.

MAYORGA, in *Geography*, a town of Portugal, in Estremadura, on the W. coast, near the Atlantic; 50 miles N. of Lisbon.—Also, a cluster of small islands in the South Pacific ocean, discovered in 1780 by don Francisco Antonio Maurelle. S. lat. $18^{\circ} 38'$. E. long. $179^{\circ} 52'$.

MAYORGA *Island*. See MAJORCA.

MAYOTTA, the most southerly of the Comorra islands, about 240 miles from the coast of Africa, and 150 from the island of Madagascar. Although this island is cold, low, and damp, and not inhabited near the coast, it abounds with provisions and fruits. S. lat. 13° . E. long. $45^{\circ} 16'$.

MAYOW, JOHN, in *Biography*, an ingenious physician and physiologist, was born in Cornwall in 1645. He was educated at Oxford, where he became a probationer fellow of All-Souls' college, having first been entered a student of Wadham. He took a degree in civil law, but afterwards studied medicine, and entered upon the practice of that profession. He seems to have resided chiefly at Bath; but died at the house of an apothecary in York-street, Covent-garden, in the year 1679.

These are all the brief memoirs that are recorded of a man, who went before his age in his views of chemical physiology, and in some measure anticipated, darkly and imperfectly it is true, some of the most remarkable discoveries in pneumatic chemistry, which the present age has produced. He published at Oxford, in 1699, "Tractatus duo, quorum prior agit de Respiratione, alter de Rachitide." These were afterwards reprinted, in 1674, with three additional dissertations, under the title of "Tractatus quinque Physico-Medici, quorum primus agit de Sale Nitro, et Spiritu Nitro-æreo, secundus de Respiratione, tertius de Respiratione factis in utero et ovo, quartus de motu musculari et spiritibus animalibus, ultimus de Rachitide." It is from the first of these treatises, on nitre and nitro-ærial spirit, that Mayow derives his claim to the originality of discovery just alluded to. His nitro-ærial or igneo-ærial spirit, the existence of which he proves by many ingenious and decisive experiments, is a constituent part of the atmospherical air, and the food of life and flame, and is the same with the oxygen, or vital air, of the modern chemists, which has become so important an object in chemical philosophy. His speculations about it are indeed mixed with much of the absurd hypothesis of the times; but some of his ideas relative to its agency nearly accord with the more recent doctrines; especially that of its absorption by the blood in the lungs, during respiration, and the production of animal heat by its means. He also anticipated the mode of operating with aerial fluids, in vessels inverted over water, and the method of transferring them from one vessel to another, under this fluid. In a word, had he lived at a later period, and possessed the lights of his successors, he would in all probability have been a distinguished improver of his science and profession. His theory of the nitro-ærial spirit runs through all his hypotheses, and he regards it as the cause of muscular motion and of the nervous energy; in which respect, he still more nearly approached some of our own contemporaries in his views of this spirit.

spirit. Dr. Beddoes republished his chemical tracts in 1790, with a view of showing his claim to some share of the credit which has been awarded to modern discoverers. Gen. Biog. Elov.

MAYPO, in *Geography*, a river of Chili, which runs into the Pacific ocean, N. lat. 33° 26'.

MAYRI, a town of Cuba; 25 miles S. of Havana.

MAYS, in *Botany*. See ZEA. This name, which we usually write Maize, seems to be an Indian word, and was introduced along with the plant which bears it, otherwise called Indian wheat, at the very earliest period of the introduction of exotic plants into Europe. Maize appears, by Turner's herbal, to have been cultivated here in 1562, and was probably brought much earlier from the east.

MAYSVILLE, in *Geography*, a post-town of America, in Mason county, Kentucky; 484 miles from Washington.

MAYTENUS, in *Botany*, a barbarous word, formed of the Chili name *Maiten*. Moiss. Chil. 152. Vahl. Enum. v. 1. 304. Juss. 449.—Class and order, *Dianthia Mongynia*. Nat. Ord. *Jasminae*, Juss.

Gen. Ch. Cal. Perianth inferior, very small, of one leaf, five-lobed. Cor. of one petal, bell-shaped, undivided. Stam. Filaments two, inserted into the corolla; anthers. . . . Pist. Germen superior, roundish; style undivided; stigma simple. Peric. Capsule small, ovate, compressed, of two cells and two valves, bursting at the edges, the partitions continued half way along the middle of the valves, which are at length reflexed. Seeds solitary, ovate-oblong, attached to the bottom of each cell; embryo flat, in a fleshy albumen.

Ess. Ch. Calyx five-lobed. Corolla bell-shaped, undivided. Capsule superior, compressed, of two cells and two valves. Seeds solitary.

1. *M. boaria*. (*Maiten*; Feuill. Chil. v. 3. 39. t. 27.) Native of Chili. A shrub or small tree, with the habit of a *Phillyrea*. About twenty feet high, much branched. Leaves sometimes opposite, sometimes alternate, evergreen, nearly sessile, elliptical, acute, serrated, smooth; dark green above, brighter beneath; with a prominent rib, and several veins. The flowers, which Feuillée did not meet with, are described by Jussieu as scattered. The last-mentioned author says one cell of the fruit, with its seed, is frequently abortive. He errs in supposing the genus akin to Forster's *Bankfia*, which is the *Pimela* of later writers, and belongs to the order of *Thymelaeae*.

"The *Maiten*," says Feuillée, "is the counter-poison of the *Llithi*;" (Feuill. Chil. v. 3. 33. t. 23, a plant whose class and genus are unknown to us), "the meer shade of which causes such swellings as to deform the human body. In case of similar accidents, a decoction of the branches of the *Maiten*, used as a fomentation to the parts afflicted, is the most speedy cure."

MAYTO, in *Geography*, a town of Mexico, in the province of Xalisco; 50 miles W.N.W. of Purification.

MAYTZ, a town of Prussia, in the province of Bartenland; 18 miles S. of Raitenburg.

MAYZE, CAPE, or *Cape Maizo*, the eastern point of the island of Cuba. N. lat. 20° 18'. W. long. 74° 10'.

MAZA, a name given by the ancients to a sort of food, in common use among the poorer sort of people. It is made of the meal of parched barley, sprinkled with some liquid, and was eaten with honey, or with defrutum.

Hippocrates every where speaks of this as of a coarse kind of bread, and advises the changing the common finer bread, in the spring season, for this coarser kind, as a thing

very conducive to health. He seems every where to consider bread as the drier, and maza the moister diet.

MAZA, *Maza*, among the Athenians, a sort of cake, which was the common fare of such as were entertained at the public expense in the common hall, or *prytaneum*.

These cakes were made with flour boiled with water and oil. Puffe. Lex. Ant. 11507.

MAZACA, in *Antient Geography*, a town of Cappadocia, in the prefecture of Cilicia, called also Maza, and sur-named Casarea. Strabo gives it the title of metropolis of Cappadocia, sur-named Eusebia, and places it on mount Argæus.

MAZAGAN, in *Geography*, a town of Africa, in the empire of Morocco; 4 leagues S. Azamore, built by the Portuguese in 1506, and named by them "Castillo Real." Under the walls of this town a dock has been made, which will admit small vessels; but large ships are obliged to anchor two leagues out at sea, on account of the cape of Azamore, which stretches to the W., and which it would be difficult to double, if a S.W. wind should drive them from their anchors. This town remained in the possession of the Portuguese till the year 1769, when the emperor of Morocco laid siege to it just as it was about to be abandoned by its former masters. It is at present entirely ruined, and almost uninhabited. At a little distance to the S.W. of Mazagan is an old tower, called Borisha, whence is derived the name of Bridja, which the Moors confound with that of Mazagan; 61 miles N. of Morocco. N. lat. 32° 54'. W. long. 8° 46'. Chenier's State of Morocco, vol. i.

MAZALIG, a town of Africa, in the country of Sulgumessa; 50 miles N.E. of Su umeffa.

MAZAMET, a town of France, in the department of the Tarn, and chief place of a canton, in the district of Castres; 9 miles S.E. of Castres. The place contains 5474, and the canton 12,410 inhabitants, on a territory of 257½ kilometres, in 11 communes.

MAZANDERAN, or MAZENDRAN, a province of Persia, situated along the southern coast of the Caspian sea, and bounded on the E. by Khorasan, encircled on the S. by a lofty branch of the Caucasian chain, which was the seat of the Mardi of antiquity, and on the W. by Ghilan. The southern part is mountainous, and nearly desert, interspersed with some pleasant vallies, and enjoying a salubrious air; this part is called Taberistan. Towards the north this province is extremely fertile, inasmuch that it is called the "Garden of Persia," and from September to April, the whole country appears like a vast parterre of flowers. The chief productions are silk, far inferior to that of Ghilan, rice and cotton, of which articles there is a large exportation. The cotton the inhabitants dye and manufacture. The province also affords sugar, excellent fruit, especially raisins, of some of which they make wine, but the greatest part is dried for sale, corn, and salt. Among the animals are tygers, deer, sheep, goats, &c. Mazanderan is well situated for trade on the Caspian sea; but the coasts are much infested by pirates. The capital is Fahrabad, or *Farabat*, which see. This province, and also those of Shirvan, Ghilan, and *Astrabad*, (which see,) are much affected by the unsettled state of Persia, and the civil wars which continue to harass that divided empire. On the death of Kerim Khan, the successor of Nadir Shah, in 1779, Persia became exposed to all the horrors of a disputed succession, and was divided between the two principal competitors. Akau Mahomed Khan, a Persian of high distinction, was castrated in his infancy by order of Nadir Shah, but possessing great civil and military talents, he became master, in 1788, of Mazanderan and Ghilan, as well

as the cities of Ispahan and Tauris. Jaafar Khan, nephew of Kerim Khan, was at that period sovereign of Shirauz, the capital, and of the southern provinces. In general, however, these provinces are governed by their own khans, who, though tributary to the sophy, render themselves occasionally independent; and as they are continually at war with each other, their governments are almost always the seat of hostility, rapine, and devastation; and the trade flourishes or declines in proportion as the exactions of the sovereigns are more or less frequent and exorbitant.

MAZANO, a town of Italy, in the Veronese; 8 miles N. of Verona.

MAZARA, a sea-port town of Sicily, in the valley of Mazara, situated on the S.W. coast, near a river of the same name, near or upon the ruins of Selinuntium. At a distance its appearance is not unpromising, as it presents to view several convents and chapels richly ornamented; but its streets are narrow and winding, and it has only one square before the cathedral. Mazaran was of some note in the time of the Romans, and many of their tombs and inscriptions are found in it. In the cathedral are some valuable sarcophagi, and one in particular, which, on account of the style of its composition, as well as its design and workmanship, is attributed to the Greeks. Mazaran was laid waste by the Saracens, and was taken from them by earl Roger, who vowed to build a church if he obtained a victory. The church does not now exist. At Mazara have been found some Punic, and many Roman coins, and those of the Saracens in their tombs. It has not now more than 7000 inhabitants, without trade or manufacture. The chief cultivation is that of cotton. Here is no harbour, but the sea enters by a channel above half a mile into the country, which would form an excellent shelter for shipping, if merchants had any inducement to come hither. Mazara is the see of a bishop; 50 miles S.W. from Palermo. N. lat. $37^{\circ} 46'$. E. long. $12^{\circ} 28'$.

MAZARELLI, a town of Sicily, in the valley of Noto; 15 miles S.W. of Noto.

MAZARIN, JULIUS, in *Biography*, cardinal, and a celebrated minister of state, was born in 1602, at Piscina, in Italy, of a noble family named "Mazarini." In the course of his education he was distinguished for his talents, and was introduced into the household of Jerome Colonna, afterwards cardinal. He followed that nobleman into Spain, where he studied the law, and on his return he took the degree of doctor. He frequented the court of Rome, and attached himself to Schetti, as he did afterwards to cardinal Barberini, to whom he afforded much assistance in his attempts to effect an accommodation between the different powers. When the French were just preparing to attack the Spanish lines before Casal, Mazarin rode out of them, exclaiming "Peace, Peace," and brought proposals to the French general, which caused a suspension of arms, which was followed by the treaty in 1631. His service was rewarded by the pope with a place, and in 1634 he was sent as vice-legate to Avignon, and nuncio to the court of France. He there acquired the esteem of Richelieu, and of the king, Lewis XIII., who procured for him a cardinal's hat: and after the death of Richelieu, the monarch created him counsellor of state, and one of the executors of his will. At the death of Lewis, in 1643, Mazarin was immediately placed at the head of the government by the regent queen Anne of Austria, who had the most unbounded confidence in him; he was a very different man from Richelieu; he was simple and modest in his appearance and equipage; insinuating in his manners and he ever affected

to carry his points rather by gentle means than by the force of authority. The rapacity of his disposition soon raised a powerful party against him, while his foreign manners threw a ridicule over him which rendered him contemptible. Some edicts of taxation being refused verification by the parliament of Paris, Mazarin caused the president Blancmesnil, and the counsellor Broussel to be imprisoned. This was the signal for the civil wars which commenced in 1648, in which the Parisians were excited to revolt by De Retz, with several princes of the blood and nobles. The queen, the young king, and the minister, were obliged to take refuge at St. Germain. Mazarin was proscribed as a public disturber of the peace: Condé, then on the side of the court, besieged Paris, and the "war of the Fronde" ensued, which was more fertile in satirical songs and epigrams, than in important events. An accommodation was effected in 1649; by which the parliament preserved its right of assembling, and the queen kept her minister. In the following year, fresh disturbances led the parliament to issue a decree, banishing Mazarin from the kingdom. He made his retreat to Cologne, whence he continued to govern the kingdom by his counsels. In 1652 Mazarin returned to France with 7000 men whom he had raised, but being regarded by parliament as a public enemy, he was obliged a second time to retire. In 1653 he entered Paris amidst the acclamations of the inconstant people, and even the parliament, from which a more steady line of conduct might have been expected, received him with distinguished honours. Henceforward his powers were unlimited: in 1655 he made a treaty with Cromwell, of which one of the conditions was the refusing Charles II. an asylum in France. The war with Spain was terminated in 1659, by the peace of the Pyrenées, negotiated in person between Mazarin and the Spanish prime minister. The cession of Alsace to France was one of its conditions, and the marriage of the young king to the infanta of Spain was another. After this the cardinal assumed a greater state, and ruled with a more absolute sway; while the queen-mother lost all her influence, and was reduced to insignificance. History has handed down a variety of heavy charges against him; such as having purposely brought up the young king in ignorance, not having signalized his administration by a single grand or useful national establishment; and having amassed such a fortune as no other minister ever had, amounting, it was said, to two hundred millions of livres, or eight millions sterling. His prosperity was of no long duration: he was attacked by a disease which his constitution could not resist. When sensible of his danger he began to feel scruples concerning the wealth which he had heaped together, and his confessor plainly told him that restitution was necessary for his salvation. He gave the whole to the king, in the hope that, as was the case, his majesty would restore it to him. He died in 1661, at the age of fifty-nine. The letters of cardinal Mazarin, containing his negotiations at the peace of the Pyrenées, were published in two volumes 12mo. in 1745. The tracts on the controversy respecting the war of Fronde were so numerous, that a complete collection of them amounted to forty-six volumes 4to. The administration and talents of Mazarin have been compared with those of Richelieu, but the commanding features which distinguished the latter are in vain sought for in the former. Prudent, subtle, and avaricious, he endeavoured to soothe rather than command; to deceive than to vanquish; and the love of glory either did not exist in his bosom, or was lost in his insatiable thirst of money. Moreri. Hist. of France. 1790.

MAZARINA, in *Geography*, a town of Sicily, in the valley of Noto; 20 miles N.E. of Alicata.

MAZAT-

MAZATLAN, a town of Mexico, in the province of Chiametlan, on a river of the same name, which runs into the Pacific ocean; 40 miles N.W. of Chiametlan. N. lat. 23° 15'. W. long. 106° 46'.

MAZE, in *Gardening*. See **Labyrinth**.

MAZEAS, JOHN-MATHURIN, in *Biography*, a mathematician, was born at Landernau, in Brittany, in 1713, and died in 1802. He wrote *Elements of Arithmetic, Algebra, and Geometry*, with an Introduction to Conic Sections; he was also the author of "*Institutiones Philosophicæ*," three vols. 12mo. He was an ecclesiastic, and held a canonry in the church of Notre Dame, at Paris, before the Revolution. *Nouv. Dict. Hist.*

MAZERAY, in *Geography*, a town of Persia, in Khorasan; 100 miles W.S.W. of Naffapour.

MAZEUTOXERON, in *Botany*, Billard. *Voy.* (English edition), v. 2. 8, and 65. t. 17 and 19. See **COUZA**.

MAZIERA, or **MEDJARE**, in *Geography*, an island in the Indian sea, near the E. coast of Arabia, 60 miles long and 8 wide. N. lat. 20°. E. long. 74°.

MAZIERES, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Parthenay. The place contains 605, and the canton 8447 inhabitants, on a territory of 257½ kilometres, in 12 communes.

MAZIL, a town of the island of Cuba; 20 miles W.S.W. of Bayamo.

MAZOCHI, ALEXIO SYMMACHO, in *Biography*, an Italian antiquary, was born near Capua in 1684. He acquired in early life an attachment to literature, and became distinguished for his acquirements. He went through a regular course of philosophy and theology at Naples, and he afterwards became professor of the Greek and Hebrew languages, and obtained some preferment in the church. He was author of several ingenious works, of which the principal was the result of the discovery of the ruins of an amphitheatre at Capua: it was entitled "*Campani Amphitheatri Titulum, aliasque nonnullas Campanas Inscriptiones Commentarius*," 1727. This he afterwards very much enlarged. In 1739 he published an epistle "*De dedicatione sub Aescia*," on which he employed much erudition. He published many other antiquarian pieces: as "*A History of the Cathedral of Naples*:" "*Commentarium in Regii Herculanensis Musæi Æneas Tabulas Heraclienfes*:" "*Spicilegium Biblicum*," three vols., of which the two first relate to the Old Testament, the last to the New. He died at Naples in 1771, at the age of 86. He was a man void of ambition, and attached to a sober, studious, and retired life. He bequeathed to the poor his library and the little property which he had accumulated. *Gen. Biog.*

MAZONOMUS, among the *Ancients*, a very large dish, commonly of wood, in which the maza was served.

MAZORBO, in *Geography*, one of the islands in the dogado of Venice, and podestaria of Torcello, composed of three small islands, united by bridges. It has two churches.

MAZORMO, a town of the state of Venice, on the N. bank of the Po; 22 miles S. of Venice.

MAZOUNAH, a town of Algiers, nearly surrounded by the river Shelliff, and celebrated for its woollen manufacture; 30 miles S. of Mustyganain.

MAZULA, in *Ancient Geography*, the name of two towns in Africa propria, according to Ptolemy. He places one on the coast, and gives it the title of a colony, and the other a little inland.

MAZULA, in *Geography*, a town of Africa, in Congo, on the coast; 50 miles S.S.W. of Bombi—Also, a small

island in the Atlantic, near the coast of Africa. *S. lit.* 8° 5'.

MAZUR, a species of birds which the Arabian sailors esteem very lucky, because it lays its eggs close by the sea-shore before good weather; so that when these are observed, they promise themselves a safe voyage. They also pretend that this bird gives notice to sailors, when the ship approaches any danger, by flying and fluttering up and down.

MAZUS, in *Botany, so denominated by Loureiro, from *μαζο*, a nipple, on account of the little stalked tubercles, which fill up the mouth of the corolla. *Lourei. Cochinch.* 385. *Brown Prod. Nov. Holl.* v. 1. 339.—Clas. and order, *Dialymania Angiospermia*. *Nat. Ord. Personate, Lami. Scrophularia*, Juss.*

Gen. Ch. Cal. Perianth inferior, of one leaf, large, bell-shaped, five-sided, permanent, with five lanceolate, spreading, nearly equal segments. *Cor.* ringent; its upper lip pointed, in two lobes, reflexed at their tips; lower longer, in three rounded, inflexed, undivided lobes, and two prominences at its base; the throat marked externally with two furrows, and lined with stalked glands. *Stam.* Filaments four, two of them longer, approaching each other in pairs; anthers oblong, combined. *Pist.* Germen superior, roundish; style thread-shaped, equal in length to the longer stamens; stigma spatulate, of two spreading plates. *Peric.* Capsule roundish, enclosed in the calyx, compressed, of two cells, and two undivided valves, with partitions from their centre. *Seeds* numerous, ovate, small.

Ess. Ch. Calyx bell-shaped, in five equal segments. Corolla ringent; upper lip cloven, reflexed at the sides; lower three-lobed, with two swellings at the base. Capsule of two cells, with many seeds. Anthers combined.

1. *M. rugosus*. Lour. (*Lindernia japonica*; Thunb. *Jap.* 253? *Brown.*)—Flowers numerous, in a long cluster.—Native of fields in Cochinchina, where it is called *Rau dâng lông lá*. An annual herb, about six inches high, branched, and nearly erect. *Leaves* opposite, ovate, serrated, rugose. *Flowers* pale violet, in long loose clusters.

2. *M. Pumilio*. *Brown*. Stalks bearing from one to four flowers, smooth as well as the calyx. Gathered by Mr. Brown in Van Diemen's land. A small herb. *Leaves* clustered at the root. *Flower-stalks* radical, either simple or racemose.

We cannot perceive any clear distinction between this genus and *Mimulus*, to which Mr. Brown allows it is nearly allied. See **MIMULUS**.

MAZZAFERRATA, GIO. BAT., in *Biography*, a musical composer, who published at Bologna, in 1677, "*Cantate*," or "*Canzonette da Camera a Voce sola*," not very good music indeed; but the author seems to have been one of the first composers who used the technical terms *vivoce*, *largo*, and *ardito*, to indicate the time of the several movements. Before that it was done by *moods* at the side of the clef.

MAZZANTI, FERDINANDO, an opera singer in soprano, of great eminence in the bravura style of the middle of the last century. He sung, when we heard him at Rome in 1770, not only with an exquisite taste, but was a good musician, and not a mean performer on the violin. He was not only a reader, but a writer of music, having himself composed operas and motets for voices; but trios, quartets, and quintets for violins. He had a great collection of Palestrina's compositions, of which he was truly sensible of the superiority to those of all other ecclesiastical composers of his country, a *capella*, and had made, by way of study, an abridgment of the modulation of that venerable father of sacred music of the most pure and reverential style, which

he had digested with great judgment and intelligence. He came to England as a singing-master about the year 1773, and remained here till the time of his death. During the last years of his existence, oppressed with age, infirmities, and poverty, he was reduced to the utmost misery and wretchedness. His temper was not amiable: he was naturally peevish, impatient, and disputatious, so that his sufferings were not diminished by philosophy or resignation. He seems not to have made a friend in this country during more than thirty years residence, except La Blancherie, who solicited those who had been long laid under contributions for himself, to extend their benevolence to Mazzanti, and for a certain time procured him succour; but subscriptions and collections at length failing, and having no possessions left that were convertible to money or food, except his favourite violin, which he brought from Italy, he reluctantly permitted his sole friend, Blancherie, to negotiate a raffle for it, at half a guinea a ticket, and in a short time the requisite number being disposed of, chiefly to musical professors, on Saturday, May 11th, 1805, the raffle took place at Menzani's music shop, when the blind and capricious goddess, Fortune, for once, seems to have had a glimmering of light and reason, in throwing her handkerchief at Francis Cramer, who so well knew the use of the lot with which he was crowned. But, alas! during the conflict of the adventurers for Fortune's favour, the poor mortal who furnished the prize expired!

MAZZARUNI, in *Geography*, a river of Sicily, which runs into the sea, on the S. coast; three miles S.E. of Teranova.

MAZZO, a town of Italy, in the Valteline; nine miles W. of Sondrio.

MAZZOCCHI, DOMENICO and VIRGLIO, in *Biography*, two brothers, the most eminent musicians in Rome during the early part of the seventeenth century. Domenico was a voluminous and excellent composer. He is much celebrated by Kircher, and was almost the last successful madrigalist in Italy, after Luca Marenzio. He seems to have penetrated deeper into latent effects and refinements than his contemporaries. In 1638, he dedicated a set of madrigals, which he published at Rome, to cardinal Barberini. In his dedication, he pronounces madrigals to be "the most ingenious species of composition that music could boast. And yet," he says, "that few were then composed, and still fewer sung; as they were nearly banished from all academies, or concerts."

As secular melody was improved by the cultivation of dramatic music, so choral harmony was meliorated by the new combinations that were hazarded in madrigals. And the two Mazzocchi, during this period, contributed greatly, by their numerous works for the church, to improve the more solemn and grave manner of writing for sacred purposes, by extending the bounds of harmony, without which ecclesiastical music could not sustain its dignity, or be suitable to the purposes of its destination. A clear, picturesque, and graceful melody seems infinitely more necessary for the stage than the church; as it is there the voice of passion, and medium through which lyric and narrative poetry can alone be rendered intelligible. In the church, where new poetry, prayers, or sentiments of piety seldom have admission, and where nothing is sung that has not often been previously read and heard by every member of the congregation, the clothing such portions of scripture, or of the liturgy as are appointed to be sung, in rich and complicated harmony, adds greatly to their solemnity, by precluding all such frivolous and fantastical strains as remind the hearer of secular amusements.

Domenico Mazzocchi, besides several new combinations, and a more bold and masterly use of discords in ligature than can be found in the works of his predecessors, if we except Monteverde, first proposed several refinements in the execution of his madrigals, and invented characters of *crescendo*, *diminuendo*, *piano*, *forte*, and the enharmonic sharp. In his eighth madrigal he has made the most frequent use of these new indications. Page 73, there are, indeed, misapplications of the enharmonic diesis to E and B sharp, which is at present rightly appropriated, by the most accurate contrapuntists, to notes that have been already sharp, as a sign of their being still raised a semitone minor. Enharmonic, similar to that of the ancients, we have none, nor is it practicable in modern counterpoint, where, having no fundamental base for quarter tones, their use in harmony would produce no other effect to the hearer than that of singing or playing out of tune.

The only madrigalists after Mazzocchi, who much distinguished themselves, were Stradella, Alessandro Scarlatti, Bononcini, Lotti, Perti, and Caldara, of whom we shall have occasion to speak among the most eminent composers of operas and cantatas.

It seems an indispensable duty to inform the curious reader, that there is a madrigal (*Cor mio*) by this composer, for four sopranos and a contralto voice, inserted in the second part of P. Martini's "Saggio di Contrap," which surpasses in art and ingenuity all the compositions of that kind which we have seen. The expression of the words, and passages of imitation, are still elegant and new. The learned editor has pointed out all its beauties in an excellent commentary.

MAZZOCCHI, VIRGLIO, brother to Domenico, first maestro di cappella to the pope, and master to Bontempi, the musical historian.

MAZZONO, in *Geography*, a town of Naples, in the province of Lavora; seven miles S.W. of Capua.

MAZZUCHELLI, GIAMMARIA, Count, in *Biography*, who flourished in the eighteenth century, was distinguished for his acquaintance with Italian literature. He was author of several works, of which we may notice "Notizie Historiche e Critiche intorno alla Vita, alle Inventioni, ed agli Scritti di Archimede Siracusano;" "La Vita di Pietro Aretino;" he began a biographical work on the writers of Italy, entitled "Gli Scrittori d'Italia. &c." of which he only finished the two first letters in the alphabet.

MAZZUOLI, FRANCESCO. See PARMEGGIANO.

MAZZUOLI, GIROLAMO, the cousin and pupil of Francesco, is little known as a painter beyond Parma and its districts, though for "impasto," and the whole mystery of colour, he has few equals. There is reason to believe that several pictures painted by this artist, especially those of a higher and gayer tone, are constantly ascribed to Parmeggiano. He was more attached to the style of Correggio than Francesco, and seized its character with great avidity in the nuptials of Santa Catherina in the church del Carmine. He excelled in perspective, and in the Last Supper, in the refectory of Santa Giovanni, placed and painted a colonnade with all the illusions of Pozzo. To the most harmonious chiaroscuro, he added grandeur, variety, and vivacity in fresco. He had a son, Alessandro Mazzuoli, who painted in the dome of Parma 1571. He is a feeble imitator of the family style. Fuseli's Pilkington.

MBACQUA, in *Geography*, a town of South America, in Buenos Ayres; 120 miles E. of Corrientes.

MBOMBOY, a river of Paraguay, which runs into the Parana.

MBOTELEY,

MOPELEY, a river of Paraguay, which runs into the Parana.

MEACO, or **MIACO**, called also *Kio*, a city of Japan, in the island of Nippon, the ancient metropolis of the whole empire, and now the spiritual capital, being the residence of the Dairi, and second city of the empire, is situated near the middle of the southern coast, on a spacious and fertile plain, about 160 miles S.W. from Jedo, the reputed capital. Nevertheless this is the first commercial city, and is celebrated for the principal manufactures. It is also the seat of the imperial mint, and as the Dairi's court is literary, all books are printed here. It is surrounded at some distance by high mountains, much covered with stately temples, monasteries, burying-places, and pleasure houses, all of which are adorned with gardens and orchards, and a great variety of verdure, as they are watered by a great number of rivulets which flow from those mountains. These streams unite in the centre of the city, and there divide it into the Upper and Lower Towns. The whole city, when in its greatest splendour, appears by its high and stately walls to have been about 20 miles in length and nine or ten in breadth; to which we may add its spacious suburbs, and the imperial palace, which of itself is a kind of city, separated from the rest. The streets are narrow, but long and straight; and we learn from Kæmpfer, that by an enumeration of the inhabitants in 1674, they amounted to 405,642, of whom 182,070 were males, and 223,572 females, without including the numerous attendants of the Dairi, and probably the children, together with an immense number of strangers, who resort thither from all parts of the empire. Its temples are numerous, and beyond conception magnificent and splendid. Although Meaco has suffered much from pillage, massacre, and conflagration, it is still the grand storehouse of all the manufactures of Japan, and of all foreign as well as domestic merchandize, and the principal seat of commerce. Here they refine their metals, coin their money, print their books, and carry on all sorts of manufactures: here they weave and dye the richest silks and stuffs, make and sell the most beautiful Japan work, porcelain, musical instruments, paintings, carvings, all sorts of gold, silver, and copper articles, and particularly steel of the most excellent quality, and most curious workmanship: they also prepare in this place dresses of all sorts for both sexes, which are fit for use, and they manufacture a variety of toys and trinkets. In a word, there is no kind of commodity which may not be procured at Meaco, nor any kind of workmanship which its artists will not imitate. N. lat. 35 24'. E. long. 153 30'.

MEAD, RICHARD, in *Biography*, a very eminent physician, was born at Stepney, "a small village near London," as it is called by his biographer, in August, 1673, of which parish his father, the Rev. Matthew Mead, a Presbyterian, was one of the two ministers; but had been ejected, for non-conformity, in the year 1662. As he had a handsome patrimony, being descended from a considerable family in Buckinghamshire, he continued to reside in the parish, (preaching to a numerous congregation of dissenters,) and bestowed a liberal education on his large family, under a private tutor, at home. This little domestic school, however, was broken up in 1683, when Mr. Mead, having been accused of participating in a plot against government, thought proper to retire to Holland, leaving Richard, his eleventh child, under the care of Mr. Singleton, an able classical scholar, who had been ejected from the office of second master of Eton school as a non-conformist. Richard made great progress in his classical studies, which he proceeded to finish at Utrecht, under the learned Grævius, in 1689. After

a residence of three years at that place, he determined upon the study of physic, and went to Leyden, where he attended the lectures of Hermanus Boerhaave, and of Peter van der Meer, and practised his profession. He received much friendly attention from the latter, from whom he imbibed the mathematical principles of that science, which were prevalent in his early writings. He then commenced his travels, and visited the principal cities of Italy, where he graduated in philosophy and physic, at Padua, in August 1695. On his return to England, in 1696, he settled in the very house in which he was born, and prosecuted his profession for several years with considerable success; and, in 1699, he married the daughter of a merchant in London. His first publication, entitled "A Mechanical Account of Poisons," which contained the result of many experiments, made with the poison of the viper, &c. appeared in 1702, and gained him considerable credit. In subsequent editions, however, he candidly retracted some points of his mechanical theory, which more mature observation convinced him was inadequate to explain the functions of a living body. Soon after the publication of this treatise, he was elected a member of the Royal Society, of which he was afterwards appointed one of the vice-presidents by Sir Isaac Newton. In 1703, he was chosen physician to St. Thomas's hospital, when he took up his residence in Crutched Friars. In 1704, he published his treatise, "De Imperio Solis et Lunæ in Corpore humano, et Morbis inde orituris," 8vo. Physicians have always been prone to apply the fashionable philosophy of their day to the explanation of the phenomena of the animal economy; and in this essay, Mead built his reasoning on the theory of attraction, which Newton had promulgated, attempting to shew that periodical influences were produced on the living body, as upon the tides of the sea and the atmosphere. In 1707, he received the diploma of doctor of physic from the university of Oxford, through the interest, as is supposed, of Dr. Radcliffe, who was not averse to patronising a junior of rising reputation, when he was himself declining. In 1711, he removed to Austin Friars, into the house which had been inhabited by Dr. Howe, then deceased. About the same time he was appointed by the company of surgeons to read the anatomical lectures in their hall, which he continued to do during six or seven years with great applause. In 1714, his friend and patron, Dr. Radcliffe, died, and Dr. Mead took his house, in Bloomsbury-square. He was now a fellow of the College of Physicians, and he had been called into consultation in the last illness of queen Anne, a few days before her death, and pronounced more decisively on her danger than the court physicians. From this time he seems to have stood among the first of the profession; and in the beginning of 1715 resigned his office at St. Thomas's hospital, partly in consequence of his full employment, and partly of the distance of the hospital from his residence.

The occurrence of the plague at Marseilles, in 1719, occasioned great alarm in London, where the dreadful mortality of 1665 was not forgotten; and by the direction of the lords of the regency, the secretary of state applied to Dr. Mead for his opinion of the nature of the malady, and of the best means of preventing its introduction into this country. In consequence of this application, he published, in the following year, "A short Discourse concerning pestilential Contagion, and the Methods to be used to prevent it," dedicated to Mr. Craggs, the secretary of state. In this work he decidedly maintained the contagious nature of the plague, which had been questioned in France, and laid down a plan for the purpose of cutting off all communication of

the infection, by quarantine, lazarettos, and other means of seclusion. This tract passed through no less than seven editions in one year: to the eighth, in 1723, was added a new chapter on the method of cure; and the last, published in 1744, was still farther enlarged: it was translated into Latin by Mattaire, and afterwards by professor Ward.

In the year 1721, Dr. Mead was directed by the prince of Wales (afterwards George II.) to superintend the experiment of inoculating the small-pox in the persons of some criminals, which had been recommended by Mr. and lady M. W. Montague, in consequence of their knowledge of the salubrity of the practice, as performed at Constantinople, and other eastern countries. His report was favourable; so that the example of the practice was immediately set by the royal family, and its general introduction thus accelerated.

As Dr. Mead was ever anxious to support the honour of his profession by his liberal conduct, and by associating with it the character of a friend and patron of learning, so he asserted its dignity in his "Harveian Oration," read before the College in October, 1723, and afterwards published. In this oration he endeavoured to shew, that the profession was exercised by several families of distinction among the Romans; and he annexed to it a dissertation on some coins, which had been struck at Smyrna, in honour of physicians. This publication was the origin of a controversy, which was begun by Dr. Conyers Middleton, and in which Mead was supported by his friend professor Ward, of the Gresham college. Dr. Middleton, perhaps with the greater weight of erudition on his side, undertook to prove the servile condition of the Roman physicians. The controversy was carried on in a manner honourable to both parties; and Dr. Middleton, in a subsequent work on Greek and Egyptian antiquities, spoke of Dr. Mead in terms of great respect. In the same year, Dr. Mead gave an example of the honourable conduct that is due between the members of a liberal profession, in the services which he performed towards Dr. Freind, when the latter physician was committed a prisoner to the Tower, upon the suspicion of being concerned in Atterbury's plot, in consequence of some free observations which had fallen from him in the house of commons. (See the article **FREIND**.) Dr. Mead obtained his liberation in a spirited manner, and paid over to him a considerable sum, received from his patients during his imprisonment.

In 1727, Dr. Mead was appointed physician in ordinary to George II. His professional occupations were now so extensive, that for many years he had no leisure for writing. He had, so early as the year 1712, communicated to Dr. Freind his opinions respecting the importance of purgatives in the secondary fever of small-pox, upon which subject Dr. Freind published a letter in 1719. But it was not till the year 1747, that Dr. Mead printed his treatise "De Variolis et Morbilibus," which contains many valuable observations on both these diseases, and also strong recommendations of the practice of inoculation. Both this work and the Letter of Dr. Freind were made the subject of animadversion by Dr. Woodward, (whose skill in pathology appears to have been much inferior to his knowledge of natural history,) in a work entitled "The State of Physic and Diseases, &c." which gave rise to a controversy that engendered considerable acrimony in the two learned advocates for the practice. Dr. Mead subjoined to his treatise, which was written in a pure Latin style, a translation of Rhazes's commentary on the small-pox, into the same language, a copy of which he had obtained from Leyden, through the assistance of his fellow-student, Boerhaave, with whom he had maintained a

constant correspondence. It was chiefly through the patronage and interposition of Dr. Mead, that Mr. Sutton's ventilator, for the purpose of cleaning the foul air from ships, was received into the service of the navy, by an order from the admiralty, after a delay of ten years: and he still farther recommended it, by adding to a publication of several tracts that had been written on the subject, in 1749, "A Treatise on the Scurvy," in which he ascribed that fatal disease to moisture combined with putridity.

About this time, as he began to retire in some degree from the fatigues of practice, he employed his leisure in revising his former publications, and in composing others. He published in the year 1749 his "Medicina sacra, seu de Morbis insignioribus qui in Bibliis memorantur," 8vo. The object of this work was to reconcile men's minds to the sacred writings, by shewing that the diseases, mentioned in them, were explicable on natural grounds; and he supported the doctrine of some divines, who maintained especially that the *dæmoniaks* mentioned in the gospel were only insane, or epileptic persons. His last work was a summary of the experience of his active professional life, which might be deemed a bequest to his medical brethren, and was published in 1751, under the title of "Monita et Præcepta Medica," 8vo. This little volume was almost purely practical, consisting of detached observations on a variety of diseases and medicines, many of which have stood the test of subsequent experience: it was frequently reprinted, and was translated into English.

Soon after this period, the infirmities of age rendered him incapable of exertion, either as a practitioner or an author, and he gradually sunk under increasing debility, until the 16th of February 1754, when he expired, without any visible signs of suffering, in the eighty-first year of his age. He was interred in the Temple church, near his brother Samuel, an eminent counsellor, who died twenty years before him; and a monument was erected to his memory, in Westminster Abbey, by his son. He was twice married, but had issue only by his first wife, of whom four survived him; namely, a son and three daughters. Two of the daughters were married to eminent physicians, sir Edward Wilmot and Dr. Frank Nichols, who were, with himself, physicians to the king. His second wife, who was daughter to sir Rowland Allston, survived him.

The medical character has rarely obtained more respectability than in the person of Dr. Mead. He was not only in high and universal esteem on account of his professional skill, but was the greatest patron of science and polite literature of his time. He maintained a correspondence with the principal literati of Europe; all men of talents found a ready assistance from him in every undertaking; and no foreigner of any learning or taste visited London, without being introduced to Dr. Mead. His ample income was spent in a noble and hospitable way of living, in gratuities to men of science, and the encouragement of learned publications, and in the collection of scarce and valuable books, manuscripts, and literary curiosities, of which no individual of his time, in this kingdom, possessed so choice and ample a collection. Of all his treasures he made the most liberal use; for he not only freely admitted learned men of all countries to see and examine them, but he likewise entertained them at his table, and treated them with singular urbanity; uniting, as his biographer observes, "the magnificence of princes with the pleasures of philosophers."

The whole works of Dr. Mead have frequently been collected and published in various countries of Europe. A French translation of them by Coste, 1774, in two vols.

8vo. is esteemed for its numerous notes. See "Authentic Memoirs of the Life of Richard Mead, M. D." 1755. Gen. Biog.

MEAD, a wholesome agreeable liquor, prepared of honey and water.

One of the best methods of preparing mead is as follows: Into twelve gallons of water slip the whites of six eggs; mixing these well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and when boiled, add cinnamon, ginger, cloves, mace, and a little rosemary. As soon as it is cold, put a spoonful of yeast to it, and tun it up, keeping the vessel filled as it works; when it has done working, stop it up close; and when fine, bottle it off for use.

Thorley says that mead, not inferior to the best of foreign wines, may be made in the following manner: Put three pounds of the finest honey to one gallon of water, and two lemon-peels to each gallon; boil it half an hour, well scummed; then put in, while boiling, lemon-peel: work it with yeast; then put it in your vessel with the peel, to stand five or six months, and bottle it off for use. If it is to be kept for several years, put four pounds to a gallon of water.

Macquer, in his "Dictionary of Chemistry," directs to choose the whitest, purest, and best-tasted honey, and to put it into a kettle with more than its weight of water; a part of this liquor must be evaporated by boiling, and the liquor scummed till its consistence is such, that a fresh egg shall be supported on its surface, without sinking more than half its thickness into the liquor; then the liquor is to be strained, and poured through a funnel into a barrel; this barrel, which ought not to be nearly full, must be exposed to heat as equable as possible, from twenty to twenty-seven or twenty-eight degrees of Reaumur's thermometer, taking care that the bung-hole be slightly covered, but not closed. The phenomena of the spirituous fermentation will appear in this liquor, and will subsist during two or three months, according to the degree of heat; after which they will diminish and cease. During this fermentation, the barrel must be filled up occasionally with more of the same kind of liquor of honey, some of which ought to be kept apart, on purpose to replace the liquor which flows out of the barrel in froth. When the fermentation ceases, and the liquor has become very vinous, the barrel is then to be put into a cellar, and well closed; a year afterwards the mead will be fit to be put into bottles.

Every maker of metheglin or mead for sale shall take out a licence, for which he shall pay 1*l.*, and shall renew the same annually, on pain of 10*l.* (42 Geo. III. c. 38.) If any maker of metheglin or mead for sale shall conceal any of it from the view of the gauger, he shall forfeit for every gallon 5*s.* 15 Car. II. c. 11.

MEADIA, in *Botany*, so called by Catesby, in compliment to Dr. Richard Mead, the celebrated physician, who, whatever might be his merit in his profession, was not judged by his contemporaries to deserve this botanical honour; and Linnæus therefore did not confirm it. The only work of Dr. Mead's ever mentioned as giving him a claim to such distinction, is his "Mechanical Account of Poisons," in which however there is nothing botanical. Crantz, a petulant critic of Linnæus, affected to oppose him in this trifling point, saying that "Mead was perhaps more deserving than many others who had obtained such honours." If this be all that can be said for him, the matter may remain at rest. See DODECATHÉON.

MEADIA, in *Geography*, a town of Hungary, in the bannat

of Temesvar, on a small river which runs into the Danube; 51 miles S.E. of Temesvar. N. lat. 45 10'. E. long. 21 59'

MEADOW, in *Agriculture*, a name generally applied to such natural grass lands as are annually mown for hay; but more particularly to those which are so low in their situation as to be too moist for cattle to graze upon in winter, without breaking the sward, or poaching the surface, which would be highly injurious.

Meadows, from their being generally enriched with the fine mould washed down from the adjacent rising grounds, are usually of a good soil, and seldom require much other improvement than the removing of temporary imperfections, and the superabundant moisture by proper draining. But they may be of such a nature as to stand in need of a more particular treatment; as is the case when their surfaces are of a mossy, loose earthy, or a binding clayey quality, where harrowing or scarifying, and the application of top-dressings will be necessary.

They are also farther distinguished into natural and artificial, or common and watered meadows.

The former, from their being situated in the hollows and sloping sides of the vallies, where the depth of the soil has been constantly increasing by the deposition of various sorts of vegetable and other matters brought down from the higher grounds, are, it is supposed by a late writer, in a considerably greater state of fertility, and evidently better fitted for the permanent production of grass, than those from which they have derived their riches. And it has been well observed, in the report of Staffordshire, that this, of all others, is "the most productive of grass and hay, yielding sustenance for cattle through the summer and the winter, and producing an everlasting source of manure for the improvement of the adjoining lands. Also, that in all cases of extensive inclosures, the improvement of the vale land, or that formed by nature for meadow and pasture, should be first attended to. In this view, the low lands in all situations come under the head of natural meadows."

And the latter are those which lie contiguous to rivers or brooks, whence the water can be easily carried or conveyed so as to overflow the grass at pleasure. Of these there are large tracts in several parts of the kingdom, which, where skilfully managed, become highly profitable to their owners, affording not only immense crops of hay, but yielding an abundant early grass for the use of ewes and lambs, in the beginning of the spring long before the pasture or other grounds are ready to receive them.

However, as the former sort of meadow lands, from their retention of moisture in consequence of their situation, and the great depth of vegetable matter which they contain, are suggested by a late writer to be liable to throw up much more coarse herbage, of the aquatic or other kind; in many cases more drainage as well as other management will be necessary to bring them into the proper condition for the growth of good herbage than is requisite in the hay grounds in more elevated places. And that, "by a more particular attention in these respects they would, in many instances, be rendered a vast deal more productive than they are at present, and, at the same time, afford a much better and less coarse herbage. They would also admit stock upon them a much greater length of time, both in the autumn and spring season."

It may be noticed, that "the most proper season for surface draining grass lands is in the autumn, when they are firm and dry, as in the early spring months such lands are too full of moisture. The grips, or small open drains, should

MEADOW.

should be cut obliquely in the most suitable directions for conveying off the superficial stagnant water. It is a practice, in some cases, to suffer the sods or grippings that are taken out of the trenches to remain on their sides; but it is much better, and a less slovenly mode, to have them conveyed from the land and laid up in heaps, in order to their being acted upon by the winter frosts and other causes, so as to be brought into a state proper for being formed into composts with well rotted farm-yard dung. Much of this sort of draining may be performed at a small expence, and the beneficial effects be very considerable, especially where the lands are very much loaded with moisture, in the quantity of produce." Besides, such meadow lands "demand much more attention in their management in other respects, as those of their being fed by cattle, and the performing of the different operations that are proper for rendering them productive of good herbage. In these cases, stock should be turned upon the lands, and manures be applied with much care, and only when the land is in such a state of dryness as not to be injured by the poaching or breaking of the sward. The higher sorts of grafs lands, in most instances, admit of considerably more latitude in performing these different operations, as they are capable of admitting the stock as well as the dung-cart more early in the spring months, and of suffering them to remain or be applied at later periods in the autumn without inconvenience. The advantage of this attention is rendered sufficiently plain by the effects which the contrary practice produces in such meadow and other hay lands as are in a state of commonage, where the stock is admitted at all seasons, and under all circumstances."

It is evident that "these sorts of grafs lands must be applied to different purposes, according to their nature, situation, and other circumstances. Those which are of the more moist and wet kinds, whether from the nature of the soil, or the peculiarity of situation, and which have been a long time in the state of sward, are for the most part kept under the scythe; while those of the contrary descriptions, that are situated at a greater height, and of course, in most cases, possess a greater degree of firmness, are, in general, appropriated to the purpose of pasturage; though, in particular situations, where grafs land is scarce, and consequently of great value, they are occasionally likewise converted to the purpose of hay. And as grafs plants grow to the greatest height in situations where a considerable degree of moisture is constantly preserved, and, of course, afford the largest produce, it would seem that the practice of keeping them under the scythe is right on this account; as well as that of their being less firm and solid in their texture, and their mostly producing a coarser herbage. The more elevated grounds, as they bear the stock generally with less injury, and often afford both a more fine and sweet feed, are with propriety converted to the use of being fed down by animals. By a suitable management in the feeding and use of manure, the latter sort of lands may even be brought to afford a considerable produce in hay in numerous instances.

And "as it must be evident to the most superficial observation, that the breaking of the surface texture or sward of grafs lands must, in all cases, be prejudicial, not only by the destruction of plants which is thereby immediately produced, but also by the retention and stagnation of water upon them in the holes, and depressions from small portions of the turf being forced in, the necessity and utility of clearing and removing all sorts of live stock, and especially those of the heavy kinds, on both these descriptions of meadow land when mown, becomes strikingly obvious."

There is a striking fact of this sort stated in the Agricultural Report of Middlesex. "In a piece of clayey meadow land exposed to the treading of cattle during the wet season of winter, with a view of fully ascertaining the effects of the practice of suffering cattle to remain too long upon grafs hay lands, it was found that after three years, notwithstanding every possible care and attention in rolling, manuring, and sowing grafs seeds was employed, it was not restored to its former state of sward." And it has been remarked, that on the deep tough yellow clayey grafs lands in the same district, every care is taken to prevent the least degree of poaching, as "it is well known that wherever a bullock makes a hole with his foot in this kind of soil, it holds water, and totally destroys every vestige of herbage, which is not quite replaced till several years after the hole is grown up."

In regard to the exact period of continuing the feeding down of grafs lands of the hay kind, it cannot be easily regulated by any fixed rules, as it must depend much on seasons; but it should never, on any account, be continued after the grounds have become so much impregnated with moisture as to easily give way to the tread of animals. In the autumn season the heavy cattle should seldom be suffered to remain on the softer sorts of lands longer than the beginning of November, but in those of the more dry kinds, they may be let remain to the end of that month. Sheep stock may, in drier cases, be continued till February, or later; and in the spring season, if pastured at all, they should not be admitted upon such lands till they begin to possess a proper degree of firmness, which will depend on the various circumstances of the preceding season. On the more low and moist sorts of meadow land, it can probably seldom be ventured earlier than the middle of March.

It is, however, obviously a much better practice, especially where hay is the main object, not to eat them down at all, or very little, with cattle in the spring, and not so much as is the usual custom with sheep; as it is plain, that by this means the cultivation will not only ensure a more abundant produce, but a much earlier one, and, of course, have more advantage in the making it into hay and securing it.

Besides, where the lands are fertile and the grafs springs quickly, as is often the case near large towns where manure is plentiful, it may be advantageous in the view of having a second crop, as by that means the after-grafs may be cut more early, and be less in danger of being well secured; and, in all events, the after-grafs will be in a more forward state, and, of course, ready at a more early period for the admission of stock of different kinds, which, in many cases, is a circumstance of great importance to the farmer where grazing is the main object.

With respect to the most proper periods of shutting up such grafs lands as are designed for hay, they must, like those of eating them down by stock, depend on various circumstances that can only suit the particular cases. In general, however, it is the best practice not to delay it too long. When the lands are not eaten at all in the spring by cattle, after the sheep have been removed about the middle of February; nothing farther is allowed, according to the writer of the Middlesex Report, to enter the meadows, by which means a quick vegetation is promoted, as well as a more plentiful crop and more early harvest. And in other cases it should probably seldom much exceed the beginning of April, as when eaten much later, especially in the southern districts, there is not time for the grafs to produce a full crop before the commencement of the hay season, of course the farmer sustains more loss than can be repaid by any advantage in the additional feeding he may obtain. This

is therefore the best practice where the view of the farmer is hay; and it should be particularly adopted and attended to in cow-farms, where it is of much importance to cut early and at different times, in order to secure hay of a fine grassy quality, for the purpose of producing large supplies of milk. In these cases it is cut two, three, or more weeks before the usual period, as it is better not to let the feed stems rise much.

Immediately after the meadows or other grass-lands have had the cattle and other sorts of live stock removed from them, in the early spring months, and been shut up for hay, they should be prepared for the scythe, by having all sorts of obstructions picked up and removed from the surface. This work should always be executed as soon as possible, before the grass begins to spring up too much and conceal them, as it is difficult to perform the business effectually afterwards. And it has been observed, that "it is an excellent practice, but one that is too much neglected by grass-farmers in general, to have all sorts of coarse plants of the aquatic and other kinds, such as rushes, fern, docks, thistles, and various others, effectually drawn up and eradicated both from the hedge-rows and other parts of the fields, in order to prevent their running up to seed and dif-feminating themselves over the lands, and thus not only fill them progressively with all sorts of trumpery, but greatly injure the herbage. In a field on an extensive hay-farm in Middlesex, on perceiving the whole surface thickly fludded with thistle-plants, it was found that this sort of weed had been suffered to flower and perfect its seed annually, until the lands on every side had become fully stocked, to the vast injury of the hay-crops. The same thing takes place with the dock, and several other noxious plants, which strongly enforces the utility of the practice just recommended. The annual expence of performing the business is but a mere trifle, while the advantage will be real and permanent. The saving to the farmer would be considerable, by having the work regularly done as soon as the weeds shew themselves, and at the same time his young hedge-plants be prevented from being destroyed, by being shaded and choaked up by so many weeds. In order to take them up in a perfect manner, a narrow implement of the spade kind, such as is made use of in forming narrow drains, may be employed with advantage, as cutting or breaking them off is by no means effectual. After such plants have been removed, and the ground well cleared, sowing the banks and hedge-rows with the best grass-seeds, such as white clover and other similar plants, might be an excellent practice, as in this way the lands may be improved rather than injured."

In regard to plants of the rush kind, they may be easily removed by preventing the stagnation of moisture near the surface, by judicious under or surface draining, and the application of substances of the saline or calcareous kinds, such as ashes, lime, drift from the roads, and other similar materials. These are the best made use of in a dry season, in either the autumn or spring; but the latter is probably the best, as these absorbent matters will thereby be made use of at the time such plants begin to shoot and establish themselves, and when there will be the least danger of their operation being lessened or prevented by too great a degree of moisture. It has been observed, that in natural coarse meadows, or such as become so in consequence of rushes growing upon them, before they have been rendered sufficiently dry by draining, it forms a great improvement to apply a thin coat of sand evenly over the surface of them, in the proportion of from twenty to thirty common loads. By this means the sward is rendered much finer, and a much

better sort of herbage brought up; white clover being predominant in most cases where this is practised.

But there is another method that, in particular situations, may be more easy and convenient, and which has been found to quickly destroy plants of this coarse kind, by bringing up those of a finer description. This may appear extraordinary at first sight to those who have not seen its sudden and astonishing effects in this way. It is that of conducting water over the surface of such grounds; but, in this intention, it should not be suffered to have the least degree of stagnation, but be conveyed off with as much expedition as possible, by suitable drainage or other means.

M. de Chateauxvieux many years ago invented a machine, called a cutting-plough, with three sharp coulters for cutting the land about six or seven inches deep, that the manure laid upon it might be washed into the incisions made by the coulters and which also, by cutting the old roots of the grass, many new roots were produced, and a very great improvement afforded, particularly where the meadows were hide-bound and overrun with moss. And afterwards Mr. Wynn Baker, in Ireland, added two more coulters, and named it a *scarificator*; which is considered a very useful tool for the purpose of improving meadows, as well as pastures. For it has been found in practice, that if the land is first scarified, and then manured, the improvement is greater than scarifying the land after laying on the manure. And this business is said also to be well performed by a sward-dresser, invented by Mr. Amos in Lincolnshire. See *SWARD-DRESSER*.

In cases where meadow-lands are properly situated for the purpose of being watered, they may be formed properly for the purpose, probably with the most advantage, in the early autumn; but when that season cannot be conveniently employed, the work may be performed early in the spring. The methods of cutting the gutters and trenches, and of managing the whole of the process, as well as the vast utility which is the result of it, may be seen detailed under the heads *IRRIGATION* and *WATERING of Land*.

Where this practice is attempted, the farmer should commence the watering of his meadow-lands early in November, which, in most instances, affords more improvement than a dressing of the best manure that can be provided. As they are commonly the lower parts of the ground that can be made use of in this way, much may often be effected by a proper attention to the ditches in the lands that lie at higher levels, as by keeping them in such a state that they may discharge themselves freely into a large main ditch, a little above the lower parts of them, from which the water may be let off occasionally, so as to float the meadow grounds below; care being taken that it does not stagnate upon them in any way. And in managing this sort of operation afterwards, Mr. Wright advises that the floater should take care to keep the land sheltered by the water from the severity of frosty nights. And in the winter, as about January, it is necessary, he conceives, every ten days or fortnight to give the land air, and to lay it as dry as possible, for the space of a few days. "Whenever the frost has given a complete sheet of ice to the meadow, it is advisable to discontinue floating; for the frost will sometimes take such strong hold of the land, as to draw it into heaps, and injure the evenness of the surface. Attention is also to be paid to prevent the equal distribution of the water being obstructed, by the continual influx of weeds, leaves, sticks, &c." And, as the season advances, still greater attention is required from the floater in the succeeding month: "if the water be suffered to flow over the meadow, for the space of many days without intermission, a white scum, it is observed, is generated, which is found
very

very destructive to grafs; and if the water be taken off, and the land expofed in its wet ftate to a fevere frofty night, a great part of the tender grafs will be cut off. In Gloucefterfhire, two methods of avoiding thefe injuries are prafticed: one is, to take the water off by day, to prevent the fcum, and to turn it on again at night, to guard againft the froft; the other method is to take the water off early in the morning, and if that day be dry, to fuffer it to remain off for a few days and nights; for if the land experiences only one drying day, the froft at night will do little injury. The former of thefe praftices, where it is found not too troublefome, is preferable to the latter." About the middle of February, the floater fhould begin to ufe the water more fparingly than in autumn or winter; for his chief object now is to encourage or force vegetation. It is moftly found, that about the laft week of this month, if the preceding management has been good, there will be a pretty full bite for ewes and lambs. Some advife rolling in the beginning of the year, as about January.

The fame writer alfo ftates, that "about the beginning of March, the grafs on the old floated meadows will generally be fufficient to afford an abundant pafturnage to any kind of farming ftock; and the water muft be taken off for nearly a week, that the land may become dry and firm before heavy cattle are admitted. It is proper, in the firft week of eating off the fpring feed, if the feafon be cold and rainy, to give the cattle a little hay in the evening to intermix with their moift food. But the grand application of the young meadow-grafs is for ewes and lambs; and attention fhould always be paid to hurdling off the grafs, and giving ftripes acrofs the meadow, exactly in the way turnips are hurdled for fheep. The caution of Mr. Bofwell, never to feed on thefe meadows any heavier ftock in fpring than fheep or calves, feems to be judicious, but muft obviously depend much on foil; for, upon a found gravel, a praftice may be admitted, which would be mifchievous on a peat meadow." But good rich meadows, whether watered or not, are moftly ready to be cut about the middle of June.

Mr. Bofwell advifes, that "as foon as the hay is cleared from thefe meadows, cattle of any fort (no fheep) fhould be turned in for a week to eat the grafs out of the trenches, and what may be left by the mowers. Then the water fhould be worked on them, care being taken to let it only dribble over every part as thinly as poffible; this being the warmeft feafon of the year. The firft watering fhould not laft longer than two or three days, before it is fhifted to another meadow. There will foon be an after-grafs of fuch a rich and beautiful verdure as will aftonifh a fpeftator not accuftomed to it; and the quantity and quality will be beyond conception, compared with the ftate the lands were in before they were watered. He alfo further cautions us to guard by all means againft keeping the water too long upon the meadows, in warm weather. It will very foon produce a white fubftance like cream, which is prejudicial to the grafs, and fhews it has been upon the ground too long already; but if permitted to remain a little longer, a thick fcum will fettle upon the grafs, of the confiftence of glue, and as tough as leather, which will quite deftroy it."

MEADOW-Grass, in *Botany*. See POA, CYNOSURUS, and GRASS.

MEADOW-Fox-tail Grass, in *Agriculture*, a fort of field grafs, that may be cultivated to advantage on the more moift forts of foil. It is faid to be early and productive, but rather coarfe. See ALOPECURUS *Pratensis* and GRASS.

MEADOW Rue. See THALICTRUM.

MEADOW Saffron. See COLCHICUM.

MEADOW Saxifrage. See PEUCEDANUM and SESELI.

MEADOW Sweet. See SPIRÆA.

MEADOW Trefoil. See TREFOIL.

MEADOW River, in *Geography*, a river of America, which runs into lake Huron, N. lat. 45° 38'. W. long. 84° 30'.

MEADVILLE, a thriving poft-town, feated on French creek, a branch of the Alleghany, in Crawford county, Pennsylvania (N. lat. 41° 36'), and the feat of juftice for the counties of Warren and Crawford, to the latter of which it belongs. It contains about 100 houfes, and feveral ftores, and is a place of confiderable bufinefs.

MEAGOM, a town of Hindooftan, in Guzerat; 20 miles N. of Baroach.

MEAHGURRY, a town of Hindooftan, in Candeifh; 30 miles S.E. of Chuprah.

MEAHMAO, a large town of the Birman empire, on the Irawaddy, fhaded by groves of palmyra trees, and remarkable for a manufacture of coarfe cloth, fuch as is worn by the lower clafs of people; 42 miles W. of Ava.

MEAKING, a town of the Birman empire, on the right bank of the Ava; 8 miles N. of Penongmew.

MEAL. The meal or flour of England is the fineft and whitest in the world. The French is ufually browner, and the German browner than that. Our flour keeps well with us; but in carrying abroad, it often contracts damp, and becomes bad. All flour is fubject to breed worms: thefe are white in the white flour, and brown in that which is brown; they are therefore not always diftinguifhable to the eye: but when the flour feels damp, and fmells rank and mufty, it may be conjectured that they are there in abundance.

The colour and the weight are the two things which denote the value of meal or flour; the whiter and the heavier it is, other things being alike, the better it always is. Pliny mentions thefe two characters as the marks of good flour, and tells us, that Italy, in his time, produced the fineft in the world. This country, indeed, was famous before his time for this produce; and the Greeks have celebrated it; and Sophocles, in particular, fays, that no flour is fo white or fo good as that of Italy. The corn of this country has, however, loft much of its reputation fince that time; and the reafon of this feems to be, that the whole country being full of fulphur, alum, vitriol, marcafites, and bitumens, the air may have, in time, affected them fo far, as to make them diffufe themfelves through the earth, and render it lefs fit for vegetation; and the taking fire of fome of thefe inflammable minerals, as has fometimes happened, is alone fufficient to alter the nature of all the land about the places where they are. Defland. *Trait. Phyf.*

The flour of England, though it pleafes by its whitenefs, yet it wants fome of the other qualities valuable in flour: the bread that is made of it is brittle, and does not hold together, but, after keeping a few days, becomes hard and dry, as if made of chalk, and is full of cracks in all parts; and this muft be a great difadvantage in it, when intended for the fervice of an army, or the like occafions, where there is no baking every day, but the bread of one baking muft neceffarily be kept a long time.

The flour of Picardy is very like that of England, and, after it has been kept fome time, is found improper for making into pafte or dough. The French are forced either to ufe it immediately on the grinding, or elfe to mix it with an equal quantity of the flour of Brittany, which is coarfer, but more unctuous and fatty; but neither of thefe kinds of flour keeps well.

The flour of almoft any country will do for the home confumption of the place, as it may be always fresh ground; but

but the great care to be used in selecting it is in order to the sending it abroad, or furnishing ships for their own use. The saline humidity of the sea-air rusts metals, and fouls every thing on board, if great care be not taken in the preserving them. This also makes the flour damp and mouldy, and is often the occasion of its breeding insects, and being wholly spoiled.

The flour of some places is constantly found to keep better at sea than that of others; and when that is once found out, the whole caution needs only be to carry the flour of those places. Thus the French find, that the flour of Poitou, Normandy, and Guienne, all bear the sea-carriage extremely well, and they have formerly made a considerable advantage by carrying them to their American colonies.

The choice of flour for exportation being thus made, the next care is to preserve it in the ships: the keeping it dry is the grand consideration in regard to this; the barrels in which it is put up ought to be made of dry and well-seasoned oak, and not to be larger than to hold two hundred weight at the most. If the wood of the barrels have any sap remaining in it, it will moisten and spoil the flour; and no wood is so proper as oak for this purpose, or for making the bins and other vessels for keeping flour in at home, since, when once well dried and seasoned, it will not contract humidity afterwards. The beech-wood, of which some make their bins for flour, is never thoroughly dry, but always retains some sap. The fir will give the flour a taste of turpentine; and the ash is always subject to be eaten by worms. The oak is preferable, because of its being free from these faults; and when the several kinds of wood have been examined in a proper manner, there may be others found as fit, or possibly more so, than this for the purpose. The great test is their having more or less sap. See FLOUR and WOOD.

MEAL *Worm*. See WORM.

MEALY-*Tree*, in *Botany and Gardening*. See VIBURNUM.

MEAMBOLANGAM, in *Geography*, a town of the Birman empire, on the Ava; 36 miles N. of Prome.

MEAMOY, a town of the Birman empire, on the right bank of the Ava; 16 miles W. of Ava.

MEAN, the middle, between two extremes.

Thus we say, the mean motion of a planet; its mean distance, &c. meaning a motion or distance, which as far exceeds the least distance or motion, as it is exceeded by the greatest.

MEAN, middle, mean proportion, is the second of any three proportions; but in music, mean is more properly the title of the second violin in trios, as being the mean between the first violin and base. In madrigals of five and six parts, a third treble is generally termed the mean part.

MEAN, in *Lazv*, refers either to time or dignity. Thus, in the first sense we say, his action was mean betwixt the dissipation made to him, and his recovery; *i. e.* in the interim.

In the second sense, we say, there is lord *mean* or *mesne*.

MEAN, in *Logic*. See MEDIUM.

MEAN *Anomaly*, in *Astronomy*. See ANOMALY.

MEAN *Axis*, in *Optics*. See AXIS.

MEAN $\left\{ \begin{array}{l} \text{Conjunction,} \\ \text{Opposition,} \end{array} \right\}$ in *Astronomy*, is when the mean place of the sun is in $\left\{ \begin{array}{l} \text{conjunction} \\ \text{opposition} \end{array} \right\}$ with the mean place of the moon in the ecliptic. See CONJUNCTION and OPPOSITION.

MEAN *Diameter*, in *Gauging*. See GAUGING.

MEAN *Distance of a Planet from the Sun*, in *Astronomy*, is

the right line drawn from the sun, to the extremity of the conjugate axis of the ellipse in which the planet moves; and this is equal to the semitransverse axis, and is so called because it is a mean between the planet's greatest and least distance from the sun.

MEAN *Motion*, that whereby a planet is supposed to move equally in its orbit, and is always proportional to the time.

MEAN *Proportion*. See EXTREME *Proportion*.

MEAN *Time*. See TIME.

MEANA, in *Geography*, a town of Hindoostan, in Kitchwarra; 10 miles N.E. of Budawar.—Also, a town of the island of Sardinia; 21 miles S.S.W. of Lode.

MEANG, a town of Hindoostan, in Guzerat; 40 miles N.W. of Puttan-Sumnaut.

MEANGIS, a cluster of small islands in the North Pacific Ocean. N. lat. 4° 58'. E. long. 126° 55'.

MEANY, a town of Hindoostan, in Guzerat, near the coast; 40 miles S.W. of Junagur.

MEANY, *Chuppa*, a town of Hindoostan, in Guzerat, on the coast; 55 miles W. of Junagur.

MEAO, one of the small Molucca islands. N. lat. 1° 12'. E. long. 127° 3'.

MEARIM, a river of Brazil, which runs into the bay of Baranhan, S. lat. 2° 40'. W. long. 45° 30'.

MEASLES, in *Medicine*, a contagious fever, accompanied by a rash or efflorescence on the skin, of a peculiar form or distribution, which molly appears on the fourth day of the fever, and, after a continuance of four days, gradually declines together with the febrile symptoms.

This disease, like the small-pox and scarlet-fever, was not particularly described or named by the Greek and Roman physicians, but is first mentioned by the Arabians. The translators of the writings of the latter into Latin applied the term *morbilli* to the disease; as it were a *little plague*, the word *il morbo*, in Italy, signifying the plague, or *the disease*, by way of eminence. Subsequently, from the red colour of the rash, the terms *rubiole* and *rubeole* were given to this disease, and to scarlet-fever, which was confounded with it. The appellation of *rubeola* has been adopted for the measles by our best nosologists, Sauvages and Cullen. The English term *measles* seems to have been borrowed from an appearance, which was so denominated in the flesh of pork, to which the eruption of rubeola was supposed to bear some resemblance.

The disease in question is propagated solely by contagion; and it commences in children, or in adult persons of an irritable constitution, from ten to fourteen days after they have been exposed to the infection. Others, who are less susceptible, may have frequent communication with persons affected with the disease during several successive weeks, but the contagion does not act upon them, unless the body be brought into a feverish state by some incidental cause, as by taking cold, by watching, fatigue, or mental distress. Dr. Willan, in his valuable and elaborate treatise on cutaneous diseases, has described three varieties of measles, which it is important to attend to: these are the rubeola *vulgaris*, or common form of the disease; the rubeola *sine catarrho*, in which fever and catarrh do not accompany the eruption; and the rubeola *nigra*, or purple-measles.

1. The *rubeola vulgaris*, or usual form of measles, exhibits the following character. The symptoms which precede the efflorescence are, on the first and second days, irregular shiverings alternating with heat of the skin, general debility or listlessness, flushing of the cheeks, giddiness, a sensation of pain or weight across the forehead and eyes, with drowsiness; sometimes pain of the back and limbs,

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slight soreness or roughness in the throat, loss of appetite, frequent nausea, thirst, a white fur on the tongue, clear high-coloured urine, the pulse much increased in frequency, and somewhat labouring or irregular. On the third and fourth days, the same symptoms continue, but with greater violence: the eyes become tender and inflamed; the eye-lids and tarfi appear a little turgid; at the same time a serous humour is copiously discharged both from the eyes and nostrils, which occasions repeated sneezing. The disease during this period, and usually for two or three days longer, is accompanied with a frequent dry cough, hoarseness, difficulty of breathing, and a sense of constriction across the chest. In children, indeed, in whom all the symptoms of the first stage are more severe than in adults, the disease is often preceded by a harsh sounding cough for a week, or even a fortnight, before it formally commences; and sometimes, especially during the period of dentition, is attended with frequent twitchings, or even with strong convulsive fits.

We have said that the efflorescence mostly appears on the fourth day of the fever: this, however, is not invariably true. In persons who have a very delicate skin, it sometimes appears partially on the third day; while in others, of a dark and thick skin, or who have been exposed much to cold, it may not be manifest till the fifth or sixth day: and as the contagion is, in many persons, only called into action by some incidental feverishness; so it is not easy, in these cases, to ascertain the commencement of the proper eruptive fever.

The rash is first visible on the face, especially on the forehead and under the chin, and exhibits in other parts only a few scattered specks, with a somewhat warmer colour of the skin than usual. On the following (fifth) day, it is formed on the neck and breast in the morning, and is diffused, towards evening or in the night, round the trunk of the body, and along the extremities; during this day it is most full and vivid on the face. On the sixth day of the disease, the rash on the face begins to fade and subside, while the patches on the body are most red and extended; but these gradually change their appearance the day after. The patches on the back of the hand and wrist, which usually appear latest (in some instances on the sixth or seventh day), do not always decline till the eighth day. On the ninth day, there remain only vestiges of the efflorescence, marked by a slight discoloration; this, however, disappears before the end of the tenth day. When the rash begins to decline on any part, the cuticle becomes dry and rough, and soon after separates into scurf. Hence arises a very disagreeable itching of the skin which continues from the seventh to the tenth day.

The progress of the eruption is sometimes checked by exposure to continued cold; and its retrocession occasions delirium, restlessness, difficulty of breathing, pain of the bowels, diarrhoea, &c. and endangers the life of the patient. The inflammation of the eyes, the discharge of tears, the sneezing, and hoarseness, generally cease on the decline of the efflorescence, about the seventh day; at least they are always much abated at that time, and the appetite for food returns. Between the fourth and sixth days there is often a hæmorrhage from the nose, and in females an appearance of the catamenia out of their course; but these circumstances occur in other eruptive diseases.

It is necessary, however, to attend to the form and mode of distribution of the efflorescence, as well as to its progress and periods, with a view to avoid mistakes as to the nature of the disease; which has been frequently, and indeed for many centuries was constantly confounded with scarlet-fever, and other febrile rashes. The colour of the rash in the

measles, Dr. Willan observes, is less bright than in some other diseases of the exanthematous class. It verges towards the raspberry tint, rather than the scarlet or rose hue of some other rashes. On the eighth day, when the efflorescence declines, it changes to somewhat of a yellowish hue. The rash commences with distinct, red, and nearly circular dots, about the size of common flea-bites, to which most writers have compared them. Larger patches afterwards appear, or rather these dots, becoming more numerous, coalesce into larger patches, which, although not exactly defined, approach nearest in their form to the figure of a crescent, or semicircle. These patches are slightly raised, and give to the finger the sensation of an unequal surface. Many of the patches are interpersed with the same small circular dots; but there are, for the most part, large interstices of cuticle retaining its usual colour.

From these characteristic appearances of measles there are only partial variations: as, 1st. The flushed and tumefied state of the cheeks, while the fever continues, may obliterate or obscure the form of the rash on those parts. 2dly. In infants less than a year old the efflorescence is much scattered; and on the cheeks, nose, backs of the hands, &c. it often consists of distinct pimples (*papule*). The wrists, hands, and fingers are also frequently papulated in adults. 3dly. In many persons, at different ages, there are, during the height of the efflorescence, lymphatic or miliary vesicles on the neck, breast, and arms. Willan on Cutan. Diseases, p. 217, & seq.

Dr. Heberden has noticed the following particularities of the measles: "One patient was seized with a spitting on the fourth day, which continued to tease him for forty-eight hours, without suffering him to rest at all by day, or to sleep at night: the cough in the mean time almost ceased, and all the other symptoms were as mild as in a favourable sort of the measles.

"In one or two patients I have seen the eruption appear on the arms a few hours after its having been observed on the face and neck.

"Once or twice the distemper has been observed never to have reached the arms, which parts, through the whole of it, shewed none of the usual spots.

"The eye-lids have been so swelled, on the second day of the eruption, that for twenty-four hours they could not be opened.

"In several patients the marks on the face have been on the third and even fourth day of the eruption, of as bright a red as ever. In others, I have observed them to disappear entirely on this day, and all other symptoms likewise to retreat.

"I have noted a very troublesome and constant sneezing, which first came on upon this day.

"A child, five years old, became comatose the third day of the eruption, and died the next.

"The longer the preparatory symptoms have continued and the worse they were, so much the less mild the distemper proved.

"Those who have shewn the least remains of the eruption after the seventh day of the disease (and some have hardly shewn any) have appeared the best; and in those where it was still in undiminished vigour, the cough and fever have been the worst." See a Paper in the Med. Transf. of the Coll. of Phys. vol. iii. Also, Dr. Heberden's Comment. de Morb. cap. 63.

The eruptive stage of the measles is not attended with much danger, either to infants or adults. The fever, indeed, does not receive any immediate alleviation, but is often somewhat aggravated on the appearance of the rash: yet the nausea and

and vomiting seldom continue beyond the fourth day of the fever, as Sydenham has justly remarked; and the distressing heat, panting, and restlessness abate on the sixth day. The subsequent period of the disease, however, may prove fatal to patients of any age. Between the ninth and twelfth day, some children are unexpectedly attacked with great difficulty of breathing, or suffocation, and die in a few hours. In others, the diarrhoea, which usually supervenes on the disappearance of the rash, about the ninth or tenth day, continues, without intermission, for so long a period that it exhausts their strength, and they become pale and emaciated; under these circumstances aphthous ulcerations of the mouth are generally the fore-runners of death. Adults, as well as children, fall sometime into a state of hectic fever, which returns twice in twenty-four hours, without any cough or diarrhoea; and during the intervals there is great restlessness and a quick irregular pulse. The patients thus affected, for two or three successive weeks, gradually sink under the complaint; but in some instances a fatal termination seems to be averted by the appearance of boils, pustules, or suppurating tubercles on the skin, which operate very favourably with respect to the internal disorder, both in this hectic state, and in cases where the bowels or the lungs are severely affected. Sometimes this alleviation is speedily produced by an eruption of inflamed watery vesicles round the chest, or more slowly by a discharge from behind the ear, or from the ear itself, accompanied with suppuration in some of the lymphatic glands. When nothing of this kind appears externally, the inflammation of the lungs in adults is sometimes on a sudden greatly aggravated; the cough ceases, respiration becomes more and more laborious, with a sense of oppression and anxiety: the eyes are glassy, the countenance livid, the extremities cold, and the pulse scarcely discernible. After a struggle of three or four days, the disease has a fatal termination, the cause of which dissections have ascertained, in several cases, to be an effusion of lymph, mixed with blood or matter, into the cavity of the thorax. Willan.

Even when the measles pass through their course moderately and mildly, however, various disorders follow them, or a tendency to some other disease is not unfrequently left behind; so that the consequences of this fever are often more to be dreaded than the original disease itself. In many persons the cough, soon after the disappearance of the rash, recommences with violence, being attended with difficulty of breathing, fixed pain in the sides, flushing of the cheeks, quick pulse, and often with paroxysms, as in a hectic. This state is protracted much longer than pneumonic inflammation produced by cold, and more frequently terminates by effusion into the cavity of the chest, or by spitting of blood, suppuration, and confirmed pulmonary consumption. There are also some other appearances which occasionally succeed the measles, especially diseases of the skin and glandular system, which mark a cachectic state of the habit. Among these are small hard tumours, like boils, occurring on the back, loins, and lower extremities, which are very much inflamed in the beginning, and afterwards suppurate with great pain, and a sanious discharge; herpetic eruptions, in patches of watery vesicles, with an inflamed base, about the chest, mouth, &c. producing much heat, pain, and tingling of the skin; soft pustules, containing a viscid straw-coloured fluid on the head, face, breast, and thighs, succeeded by ulcerations at the corner of the mouth, with tumour of the upper lip, inflammation of the eyes, and ulcerations at the edges of the eye-lids, discharges behind the ears, enlargement and tedious suppuration of the lymphatic glands under the jaw, in the neck, arm-pits, and groin, sometimes with

pain and swelling of the joints, and every other form of serofulous disease.

Treatment of Common Measles—The *rubeola vulgaris* is usually a mild disease in the summer months, being attended with a moderate degree of fever, and but little cough; in January, February, and March, it is most frequent, and likewise most severe and dangerous.

In the eruptive stage of the disease, it is necessary to enjoin a very light diet, with mild tepid drinks; and to keep the patient in a moderate temperature, carefully guarding against any great or sudden changes. An emetic given on the second or third evening affords some slight alleviation to the violence of the catarrhal symptoms. During the eruption, however, no considerable effect appears to be produced by antimonials, or other diaphoretics; and emulsions and mucilages afford but a very feeble palliation of the cough and difficulty of breathing. The first of these objects, to wit, of softening the skin, seems to be more efficiently accomplished by the use of the warm pediluvium every evening; and the latter by the inspiration of the steam of hot water. If a diarrhoea comes on during the continuance of the efflorescence, it is generally favourable, relieving the cough, and allaying the inflammatory symptoms: where this does not supervene, therefore, it is advisable to administer occasional purgatives, which will be found to produce a similar relief, and often supersede the necessity of more violent remedies.

Almost all authors, down to our own time, have asserted the necessity of blood-letting in this disease, differing only in regard to the period when it may be practised with most advantage. Morton deemed it requisite during the height of the eruption, when he thought the disease was most inflammatory; and Sydenham recommended it after the disappearance of the eruption, when symptoms of pulmonary inflammation ensue. Whistl Mead and Heberden considered the period of the disease as of little moment in determining the propriety of the practice, which the degree of inflammatory affection in the chest, they contended, ought alone to decide. Dr. Heberden, however, recommended the use of the lancet as a general remedy in the measles. "Bleeding may be used at any time of the measles," he says, "and is always beneficial where the symptoms are very distressing, particularly an oppression of the breath, to which every stage of this distemper is liable; and *bleeding*, together with such medicines as occasional symptoms would require in any other fever, is the whole of the medical care requisite in the measles." *Med. Transf.* vol. iii. p. 404.

In case the breathing becomes suddenly difficult, threatening to suffocate the patient, at the conclusion of the disease, as Sydenham states, there cannot be a doubt that blood-letting, even in children, may be resorted to with great benefit, and ought not to be omitted: in infants the application of leeches to the chest may be sufficient. With respect to the treatment of the oppression, however, conjoined with anxiety, heaving of the chest, and a labouring pulse, which take place on the third, fourth, or fifth day of the disease, Dr. Willan justly observes, that this remedy may be dispensed with, unless there are at the same time pains in the chest, and a hard dry cough. "Those who from doubt, or from some collateral motive," he states, "are led to await the event, usually find the pulse become moderate, and the uneasy laborious respiration terminate in twenty-four hours. This oppressed breathing is, indeed," he adds, "common to other eruptive fevers, and if it were universally considered to be an indication for bleeding, the practice would often be more fatal than the disease." *Lec. cit.* p. 232.

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He goes on to remark, that "when the efflorescence in measles has wholly disappeared, and the cough, difficulty of breathing, and pains in the chest are very severe, bleeding and cupping may perhaps be repeatedly necessary. Yet, even in robust habits, some limitation is requisite to this mode of practice; since it has not an effect in alleviating the symptoms, equal to that which is experienced from it in pulmonic inflammations originating from cold. Hence we should employ as auxiliaries to bleeding, at the latter period of the disease, blisters, opium, and demulcent liquors. Sydenham prescribed an opiate every night through the whole course of the measles; but this plan seems not beneficial in the eruptive stage; I have observed, and myself felt, while labouring under the disease, that opium did not conciliate sleep, but produced an increase of heat and restlessness, and therefore seldom direct it till the efflorescence has declined. A diarrhoea occurring at this period may be accounted a most favourable circumstance, since nothing so effectually relieves the peripneumonic symptoms, or contributes more to prevent the troublesome consequences of the disease formerly mentioned. The necessity of bleeding, as a remedy for the diarrhoea, is insisted upon by Dr. Sydenham from theoretical reasoning. Experienced practitioners in London seem to have now decided, that we ought not much to interfere with this critical evacuation, but rather allow it a free course, at least for some days. Where the diarrhoea does not thus take place, it is proper to imitate the usual process of nature, by the occasional use of purgatives, which will always be found to relieve the cough, and by allaying the inflammatory symptoms, often to supersede the necessity of blood-letting."

2. The *Rubeola sine catarrho*, which is so mild as to require no medicine, is particularly entitled to notice, in consequence of a circumstance pointed out by Dr. Willan, and not observed by other writers who had mentioned its occurrence; namely, that when the eruption of measles occurs without the accompanying fever and catarrhal symptoms, it does not appear to secure the constitution from the future influence of the contagion, nor to prevent the accession of the ordinary form of the disease at a subsequent period. In this way he supposes that the instances of the recurrence of measles in the same individual, which have been recorded, are probably to be explained, unless where other diseases, scarlatina, roseola, strophulus, &c., have been mistaken for measles; for he never saw the *febrile* measles occur more than once in the same person. In some cases the non-febrile eruption has occurred at the interval of two years before the rubeola vulgaris; in other instances, a very short time has intervened. "I have seen other instances of the same kind," Dr. Willan says, "wherein the efflorescence without fever or catarrhal symptoms having declined, there appeared on the fourth day from its commencement a new efflorescence, and violent disorder of the constitution. These instances are perfectly analogous to some cases of small-pox, in which distinct pustules arise without any material complaint, and when these decline, about the eighth or ninth day after their appearance, the variolous fever takes place, with an eruption of confluent pocks over the whole surface of the body." P. 236.

The appearance of the efflorescence of measles, when the ordinary febrile and catarrhal symptoms are absent, is to be distinguished from other rashes, as well as from lichen and strophulus, which are *papular*, by a careful examination of its form and distribution, as above described. In infants, Dr. Willan observes, the eruption of measles "is more papulated, and the patches often less extensive, so that to discriminate with exactness, the patient being under two years

of age, requires both minute attention, and some previous habitude."

3. The *Rubeola nigra* is that variety of the measles, which sometimes occurs, in which, about the seventh or eighth day, the rash becomes suddenly black, or of a dark purple colour, with a mixture of yellow. This appearance has continued ten days, and in some cases longer, without much distress to the patient, and with no other symptoms of fever than a quick pulse, and a slight degree of languor. The mineral acids were administered in these cases with evident advantage. Sydenham ascribes the change of the appearance of the rash to a black or purple colour, which he occasionally witnessed in adults, to the pernicious perseverance in a heating regimen. To the influence of such a regimen, indeed, he affirms that the pulmonary inflammation, which is the most fatal symptom, as well as the diarrhoea, that continued many weeks, was generally to be imputed. See his excellent chapter on Measles, which contains the prototype of the description of the disease, that has been given by the majority of subsequent writers. Sect. iv. cap. 5.

Under the denomination of "putrid measles," sir Will. Watson described a disease, which prevailed among the children of the Foundling Hospital, in 1763 and 1768. (See Med. Obs. and Inquir. vol. iv.) On examining the symptoms of this disease, however, as detailed by sir W. Watson himself, as well as the varying appellations, which he gave to it, at different times, in his journal of the cases, Dr. Willan has shewn most clearly, that the disease in question was not measles, but scarlet-fever. There were, indeed, a cough and watery eyes among the symptoms of these "putrid measles;" but "the eruption appeared over nearly the whole body on the second day;"—"the fauces were of a deep red colour;"—"the pulse was very quick, but low;"—"the patients complained of extreme weakness, and could not bear bleeding;"—"their oppressed and difficult breathing was attended with great restlessness and anxiety, but with scarce any expectoration throughout;"—"some died under laborious respiration, more from a dysenteric purging;"—"some cases terminated in mortification of the rectum, pudenta, cheeks, gums, &c. others with caries of the jaw-bones." Now these circumstances obviously belong to scarlatina, and not to measles: indeed sir W. Watson refers them to the morbilli maligni, or epidemii, described by Morton. (De Morbillis et Febre Scarlatina.) But Morton, who calls the disease also morbilli *spurii*, expressly maintains that the measles and scarlatina are the same disease, with no more variation in their form, than there is between the distinct and confluent small-pox: he has therefore conjoined the principal symptoms (cap. iii.), and wishes to banish the distinction, and the very name of scarlatina, from medical language. Hence those readers who attend not to the names of things, but to the things themselves as described, will find that the morbilli maligni, epidemii, and spurii, and the febris morbillosa petilentialis, in his writings, have no relation to the measles, but constitute the disease, to which other writers have given the titles of angina maligna, scarlatina anginosa, and maligna, &c. Willan, loc. cit.

The original writers on the measles, however, not only laid the foundation for this error, but created a much greater confusion, by describing the small-pox and the measles as one and the same disease, which admitted of considerable variety in its form. This confusion was transmitted from the Arabian physicians, who first described these diseases, through eight or nine centuries. But as the measles and scarlet fever were deemed one and the same malady, even down to our own times; so this confusion was greater than

at first sight it appears to have been; inasmuch as these three specific contagions were treated of as one disease, including also the chicken-pox, which was separated during the last century. This circumstance enables us to explain the opinion of the Arabian physicians, that the small-pox or measles not unfrequently occurred *twice*, but rarely *thrice*, in the course of the life of an individual; since the occurrence of any one of these four diseases would be considered as a recurrence of the small-pox. It would seem extraordinary, indeed, (if we did not know how completely the observation of mankind is obscured and perverted by pre-conceived opinions,) that the almost universal occurrence of both the small-pox and the measles, in the same individuals, should have escaped their notice. Yet even so late as the time of Sennertus, this fact was not known: for that able and learned physician discusses the question, Why the disease in some constitutions assumes the form of small-pox, and in others that of the measles? (See his *Med. Pract. lib. iv. cap. 12.*) He refers it merely to some indelible idiosyncrasy, or peculiarity of habit. In his time, indeed, physicians had not entirely agreed upon the appropriation even of the names *variole* and *morbilli*; for some applied the term *variole* to the eruption of the measles, "*quæ colorem cutis variant*," they said Diemerbroeck, an able Dutch professor, still later expressed his opinion, that small-pox and measles differed only casually and in degree, not in kind. "*Differunt (morbilli) à variolis accidentaliter, vel quoad magis et minus.*" *Tractat. de Variol. et Morbill. cap. xiv.*

When the most able physicians did not step aside from the path which the Arabians had marked out for them, so as to ascertain the essential difference between the *pustular* small-pox and the *rasb* called measles, it can scarcely be expected that they should have made out the distinction between the two rashes of measles and scarlatina. It is obvious, however, that the scarlatina was known to them, and they deemed it a variety of measles, as many later writers have done.

There is no trace in medical history of the origin and primary cause of the measles, nor of the other contagious eruptive fevers; but it is commonly supposed, that they had no existence in the time of the older Greek and of the Roman physicians; since, among the accurate descriptions which they have left of many diseases, that are at present familiar to us, no distinct account of these striking and formidable maladies is to be found. This is, indeed, an extraordinary circumstance; and by those who look back to the fathers of physic, as to the only correct and unbiassed observers of nature, it is deemed conclusive evidence on the subject. We have seen above, however, that the most accomplished physicians of later times were for ages blinded by the opinions of their predecessors, so as to overlook the most glaring facts; and it is not necessary to inform the learned reader, that no succession of writers ever displayed a more servile adherence to the doctrines of their ancestors, or composed their works by a more systematic transcription of those which had gone before, than the series of Greek physicians from Galen down to Aëtarius; nor has any other class of observers been more enslaved by hypothesis, than the Greeks by the four humours of Hippocrates, and the four qualities which Galen engrafted upon them. Inasmuch that they satisfied themselves, with giving general appellations to the eruptions, connected with fevers, which they classed together, as pestilential; and deemed the *anthraxes* and carbuncles of the true plague, and the *erysipelata*, *æthymata*, *phlydænæ*, *erythemata*, *exanthemata*, *herpetes*, &c., under which most probably they included the small-pox, measles, scarlet-fever, nettle-rash, &c., as mere varieties of pestilential fever, arising from different combinations of the four humours. These eruptions

are frequently mentioned as accompanying malignant fevers by Hippocrates and Galen.

Further, it is remarkable, that the first writers (of the Arabian school) who treat of small-pox and measles, do not speak of them as new or unusual diseases. Aaron, a physician of Alexandria, and contemporary with Mahomet, considers them as the result of putridity, and similar to the carbuncles of the groin, axillæ, &c., which were often epidemical in the climate where he resided, and fatal within four or five days. Rhazes, a physician of Bagdad, who, about the middle of the ninth century, collected the observations of his predecessors, in a curious tract on this subject, takes it for granted that the small-pox and measles were known to Galen, more than six hundred years before his own time. Although we may admit, however, that the passages which Rhazes quotes (from an incorrect translation of the works of Galen, and not from the original Greek), do not bear him out in this opinion; yet it is scarcely possible to deny that the diseases in question were known *before* the time of Galen, if we carefully peruse a chapter "*de Puslulurum (ἔρυνιαζών)* in febrili curatio," written by Herodotus, and preserved by Aëtius. (See Aëtii, *tetrab. ii. ferm. i. cap. 129.*) This Herodotus was an eminent physician at Rome, in the reign of Trajan, more than half a century before the arrival of Galen in that city; the fragments of his writings, which have been transcribed by Oribasius and Aëtius, contain so much original observation and perspicuity of description, as to excite a regret that the greater part of them has been lost. Herodotus begins this chapter, by mentioning the herpetic eruptions that break out about the mouth and alæ of the nose, at the termination of catarrhal and other slight fevers. "*In febricitibus assidue sunt exanthemata circa labia et nasum, juxta febrim solutionem.*" And he recommends these to be treated with a simple liniment, or a saturnine ointment. "But," he proceeds, "in the beginning of fevers, which are not simple, but the result of vitious humours, there arise *over the whole body* patches like flea-bites; and in malignant and pestilential fevers these ulcerate, and some of them have an affinity with carbuncles. All these eruptions are signs of the redundancy of corrupt and corrosive humours in the habit; but those which appear on the face are the most malignant of all. They are worse if numerous, than if few;—the larger are worse than those which are smaller,—and those which have a short course, than those which remain a long time. Those are more dangerous too which are hot and inflamed, than those which are accompanied by itching. And those again which are conjoined with a colic or gently open state of bowels, are favourable; while those accompanied by diarrhœa and vomiting are dangerous; but if, while the successive eruptions appear, the diarrhœa ceases, it is favourable. These exanthemata are attended by malignant symptoms of fever, and often by syncope." The first species, resembling the flea-bites, (by which he probably means the measles) "are to be treated by blood-letting in the beginning, if nothing contra indicate that remedy; for if the eruptions be repelled inwards, they are wont to produce danger, unless the acrimony be carried off by vomiting or by stool." Hence he recommends "emollient clysters of pisan, with egg, and oil of chamomile, and that the evening injection should be retained all night; and likewise a spare diet, quo undique multitudo solatur." But "at the accession of the disease, on account of the violent pains at the region of the stomach, we order warm water to be given," he says, "and vomiting to be excited, by putting the finger or a feather into the throat; light cooling food, &c. &c." But in those cases where the eruptions are pestilential and carbunculous, "we employ blood.

blood-letting at the very outset, but not abstinence; for fasting renders the matter more malignant, and diminishes the vital powers, which we should support in all fevers, especially pestilential ones." He then tells us, that "the same cerates and plaisters, which are useful in burns, may be applied to the pustules, and that those on the face may be alleviated by washing with warm water." When they ulcerate, he recommends the application of poultices of bread, lentils, &c., boiled with honey; and at the same time a diet of goat's milk, to correct the morbid state of the humours. After the decline of the eruption, a proper purgative is to be administered; and the cure is to be completed by an antidote of theriaca or mithridate, "which may destroy the poisonous relics of the humours."

This account is applicable only to the exanthematic fevers, and especially to the small-pox, including measles and scarlatina; for we are acquainted with no other fevers, "occasionally pestilential, with eruptions over the whole body, that often ulcerate, especially on the face." And it appears from the conclusion of this chapter, that Herodotus was well acquainted with the danger of the confluent, and highly red or livid forms of these eruptions. "Moreover," he says, "those which are extremely red, are of the worst kind; but those which are livid, black, and tumid, like flesh that has been dotted, are still more fatal; and these are abundant on the face and breast, abdomen, sides, and back." His advice as to the conduct of the physician in these desperate cases, is curious. "In such instances it is prudent not to attempt any thing in the beginning, but to wait; for if it terminates ill, the blame will fall upon him, who endeavoured or promised to effect a cure; but if the disease goes on to its acme, without any increase of malignancy, then it should not be altogether left to itself; a little occasional assistance should be given, medicine should be administered at proper opportunities, and the cure be conducted with great vigilance. For those eruptions, which arise from beneath in a mortifying state of the surface, what can they denote but that the life is passing from within?"

It appears pretty obvious, from the preceding extracts, that the contagious exanthemata were familiarly known at Rome, at the end of the first century. For this is the language of observation and experience, and implies that the diseases, thus distinctly described, were of ordinary occurrence; their recent appearance is not once hinted at. If we trace the accounts of these exanthemata, down to the seventeenth century, even after appropriate names had been given to them, we still find a similar communion of nature, origin, and treatment, ascribed to them; and it was not till the end of the 18th century, that their peculiar characteristics were pointed out. The Arabians themselves have distinctly described the scarlatina, as a variety of measles [see Haly Abbas, Theorice. lib. viii. cap. 14. where the translator has distinguished it from the *morbilli* (or ordinary measles) by giving it the appellation of *rubeola*, from its scarlet colour]; yet the disease was still confounded with the measles, so late as the publication of sir W. Watson's paper, above referred to; so difficult it is to see with our own eyes through the veil of prejudice! Consult Rhazes de Variolis et Morbillis, translated by Channing. Sydenham, Obs. Med. sect. iv. chap. 5. Morton, de Morbis acutis, exercit. iii. Sennert. de Febribus, lib. iv. cap. 12. Diemerbroeck de Variol. et Morbill. cap. xiii. Heberden, in Med. Transact. vol. iii., and Commentar. cap. 63.; and Willan on Cutaneous Dif. order iii.

MEASURE, MENSURA, in *Geometry*, denotes any certain quantity assumed as one, or unity, to which the ratio of other homogeneous or similar quantities is expressed.

This definition is somewhat more agreeable to practice than that of Euclid, who defines measure a quantity, which being repeated any number of times, becomes equal to another; which only answers to the idea of an arithmetical measure, or quota part.

MEASURE of an *Angle*, is an arc described from the vertex in any place between its legs. Hence angles are distinguished by the ratio of the arcs, described from the vertex between the legs, to the peripheries.

Angles then are distinguished by those arcs; and the arcs are distinguished by their ratio to the periphery. See ANGLE.

It is, however, in many cases, a more simple and more convenient method to estimate angles, not by the arcs subtending them, but by their sines, or the perpendicular falling from one leg to the other. Thus it is usual, among miners, to say that the ground rises or falls one foot, or one yard, in ten, when the sine of the angle of its inclination to the horizon is one-tenth of the radius. Angles of different magnitudes are indeed proportional to the arcs, and not to the sines, so that in this sense the sine is not a true measure of the comparative magnitude of the angle; but in making calculations, we are more frequently obliged to employ the sine or cosine of an angle than the angle or arc itself. Nevertheless, it is easy to pass from one of these elements to the other by means either of trigonometrical tables, or of the scales engraved on the sector.

To measure the height of a hill, see ALTITUDE, and the latter part of the article LEVELLING.

MEASURE of a *Figure*, or plane surface, is a square; whose side is one inch, foot, yard, or some other determinate length.

Among geometricians, it is usually a rod, called a *square rod*, divided into ten square feet, and the square feet into square digits. Hence square measures. See MENSURATION.

MEASURE of a *Line* is any right line taken at pleasure, and considered as unity.

The modern geometricians use a decempeda, or rod, divided into ten equal parts, called feet. The feet they subdivide into ten digits, the digit into ten lines, &c. This decimal division of the measure was first introduced by Stevinus, probably from the example of Regiomontanus. The index or character of the decempedæ he made o, that of feet 1, of digits 2, of lines 3, &c. which, because the measure was subdivided in a decuple ratio, were the logarithms of the division. Bayer, in lieu of these, expressed the logarithms by the Roman characters; v. g. 5 perches, 4 feet, 3 digits, and 2 lines, he expressed thus; 5°, 4', 3", 2'''. It is frequently most commodious to separate the integers, or rods, from the fractions, by a point; thus, instead of 5, 4', 3'', 2''', to write 5.432. F. Noel observes, that, among the Chinese, the decimal division obtains in their common measures, and even in their weights.

MEASURES, *Line of*. See LINE.

MEASURE of the *Mass*, or quantity of matter, in *Mechanics*, is its weight; it being apparent, that all the matter which coheres and moves with a body, gravitates with it: and it being found by experiment, that the gravities of homogeneous bodies are in proportion to their bulks: hence, while the mass continues the same, the absolute weight will be the same, whatever figure it put on: but, as to its specific weight, it varies as the quantity of surface varies. See WEIGHT.

MEASURE of a *Number*, in *Arithmetic*, is such a number as divides another, without leaving any fraction; thus 9 is a measure of 27.

MEASURE, *Common.* See COMMON MEASURE.

MEASURE of a Solid, is a cube, whose side is one inch, foot, yard, or other determined length.

Among geometers, it is sometimes a rod, or perch, called a *cubic perch*; divided into cubic feet, dials, &c. Hence cubic measures, or measures of capacity. See CUNZ and MENSURATION.

MEASURE of Velocity, in *Mechanics*, is the space passed over by a moving body in any given time.

To measure a velocity, therefore, the space must be divided into as many equal parts as the time is conceived to be divided into. The quantity of space answering to such an interval of time, is the measure of the velocity.

MEASURE, *Universal and Perpetual*, is a kind of measure unalterable by time, to which the measures of different nations and ages might be reduced, and by which they might be compared and estimated. Such a measure is very desirable, if it could be attained. Huygens, in his *Horol. Oscill.* proposes, for this purpose, the length of a pendulum, vibrating seconds, taken from the point of suspension to the point of oscillation. The third part of such a pendulum may be called the horary foot, and serve as a standard to which the measure of all other feet may be referred. Thus, *v. g.* the proportion of the Paris foot to the horary foot would be that of 864 to 881; because the length of three Paris feet is 864 half lines, and the length of a pendulum, vibrating seconds, contains 3 horary feet, or 3 feet $8\frac{1}{2}$ lines, *i. e.* 881 half lines. But this measure, in order to its being universal, supposes, that the action of gravity is every where the same, which is contrary to fact; and, therefore, it would really serve only for places under the same parallel of latitude; and in order to its being perpetual, it supposes that the action of gravity continues always the same in the same place. (See PENDULUM) See also on the subject of a standard of measures, the article STANDARD, under which head the different modes of ascertaining it will be detailed and discussed.

MEASURE, in a legal, commercial, and popular sense, denotes a certain quantity or proportion of any thing bought, sold, valued, or the like. It denotes also a vessel of capacity employed in measuring grain and other articles; the fourth part of a peck.

The regulation of weights and measures ought to be universally the same throughout the kingdom, and should, therefore, be reduced to some fixed rule or standard; the prerogative of fixing which was vested, by our ancient law, in the crown. This standard was originally kept at Winchester; and we find, in the laws of king Edgar, cap. 8, near a century before the Conquest, an injunction, that the one measure, which was kept at Winchester, should be observed throughout the realm. With respect to measures of length, our ancient historians (Will. Malm. in Vita Hen. I. Spelm. Hen. I. apud Wilkins, 299.) inform us, that a new standard of longitudinal measure was ascertained by king Henry I. who commanded that the ulna, or ancient ell, which answers to the modern yard, should be made of the exact length of his own arm; and one standard of measures of length being once gained, all others are easily derived from hence; those of greater length by multiplying, those of less by subdividing the original standard. Thus, by the statute, called "*Compositio ulnarum et perticarum*," $5\frac{1}{2}$ yards make a perch; and the yard is subdivided into 3 feet, and each foot into 12 inches; which inches will be each of the length of 3 grains of barley. The standard of weights was originally taken from corns of wheat, whence the lowest denomination of weights which we have is still expressed by a "grain;" 32 of which are directed by the statute, called "*Compositio mensurarum*,"

to compose a pennyweight, of which 20 make an ounce, 12 ounces a pound, and so upwards. Upon these principles the standards were first made; which, being originally so fixed by the crown, their subsequent regulations have been generally made by the king in parliament. Thus, under king Richard I. in his parliament holden at Westminster, A.D. 1197, it was ordained that there should be only one weight and one measure throughout the kingdom, and that the custody of the assise or standard of weights and measures should be committed to certain persons, in every city and borough. (See ALMAGER.) In king John's time, the ordinance of king Richard was frequently dispensed with for money (Hoved A.D. 1201); which occasioned a provision to be made for enforcing it, in the great charters of king John and his son. Stat. 9 Hen. III. c. 25.

The statute of Magna Charta, cap. 25, ordains, that there shall be but one measure throughout England, according to the standard in the exchequer; which standard was formerly kept in the king's palace; and in all cities, market-towns, and villages, it was kept in the churches. (4 Inst. 273.) By 16 Car. I. cap. 19, there is to be one weight and measure, and one yard, according to the king's standard, and whoever shall keep any other weight or measure, whereby any thing is bought or sold, shall forfeit for every offence five shillings. And by 22 Car. II. cap. 8, water measure, (*viz.* five pecks to the bushel,) as to corn or grain, or salt, is declared to be within the statute 16 Car. I. And if any sell grain or salt, &c. by any other bushel, or measure, than what is agreeable to the standard in the Exchequer, commonly called Winchester measure, he shall forfeit 40s. &c. (22 Car. II. c. 8. 22 and 23 Car. II. c. 12.) Notwithstanding these statutes, in many places and counties there are different measures of corn and grain; and the bushel in one place is larger than in another; but the lawfulness of it is not well to be accounted for, since custom or prescription is not allowed to be good against a statute. (Dalt. 250.) It is now settled, that no practice or usage can countervail the statutes 22 Car. II. c. 8. 22 and 23 Car. II. c. 12. above cited. 4 Term Rep. 750. 5 Term Rep. 353.

There are three different measures, *viz.* one for wine, one for ale and beer, and one for corn. In the measure of wine, 8 pints make a gallon, 8 gallons a firkin, 16 gallons a kilderkin, half barrel or rundlet, 4 firkins a barrel, 2 barrels a hogshead, 2 hogsheads a pipe, and 2 pipes a tun. (Stat. 15 R. II. c. 4. 11 H. VII. c. 4. 12 H. VII. c. 5.) In a measure of corn 8 pounds or pints of wheat make the gallon, 4 gallons a peck, 4 pecks a bushel, 4 bushels a sack, and 8 bushels a quarter, &c. And in other measure, 3 barley corns in length make an inch, 12 inches a foot, 3 feet a yard, 3 feet and 9 inches an ell, and $5\frac{1}{2}$ yards or $16\frac{1}{2}$ feet, make the perch, pole, or rod. (Stat. 27 Edw. III. c. 10.) Selling by false measure, being an offence by the common law, may be punished by fine, &c. upon an indictment at common law, as well as by statute. See the statute 11 Hen. VII. c. 4. which inflicts particular fines for offences, pillory, &c. The more easy and usual mode of punishment is by levying, on a summary conviction, by distress and sale, the forfeiture imposed by the several acts of parliament adapted to particular frauds.

MEASURES are various, according to the various kinds and dimensions of the things measured. Hence arise *lineal* or *longitudinal* measures for lines or lengths; *square* measures for areas or superficies; and *solid* or *cubic* measures for bodies and their capacities. All these again are very different in different countries, and in different ages, and even many of them for different commodities. Whence arise

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arise other divisions of *domestic* and *foreign* measures, *ancient* and *modern* ones, *dry* and *liquid* measures, &c.

Under this head the reader will find enumerated and exhibited in tables, the various general standing measures, long, square, and cubic, now or heretofore in use, with their

proportions and reductions: for particulars we refer to the following heads; as FOOT, DIGIT, ELL, TUN, GALLON, BUSHEL, PERCH, LEAGUE, FURLONG, &c.

MEASURES, *Affay of*. See ASSAY.

MEASURES, *Standard of*. See STANDARD.

The Tables of different Measures, extracted from various Publications, are as follow; beginning with Measures of Length.

TABLE I.—Scripture Long Measures.

										Engl. Feet	Inch. Dec.		
Digit	— — — — —									0	0.912		
4	Palm	— — — — —									0	3.648	
12	3	Span	— — — — —								0	10.944	
24	6	2	Cubit	— — — — —							1	9.888	
96	24	8	4	Fathom	— — — — —						7	3.552	
144	36	12	6	$1\frac{1}{2}$	Ezekiel's reed	— — — — —					10	11.328	
192	48	16	8	2	$1\frac{1}{2}$	Arabian Pole	— — — — —					14	7.104
1920	480	160	80	20	$13\frac{1}{2}$	10	Scœnus, measuring line	— — — — —			145	1.104	

N. B. There was another span used in the East, equal to $\frac{1}{4}$ th of a cubit.

TABLE II.—Grecian Long Measures reduced to English.

										Engl. Paces.	Feet.	Inch. Dec.			
Dactylus, Digit	— — — — —									0	0	0.7554 $\frac{1}{5}$			
4	Doron, Dochme, Palesta,	— — — — —									0	0	3.0218 $\frac{1}{2}$		
10	$2\frac{1}{2}$	Lichas	— — — — —								0	0	7.5546 $\frac{2}{3}$		
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron	— — — — —							0	0	8.3101 $\frac{9}{17}$		
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame	— — — — —						0	0	9.0636 $\frac{1}{2}$		
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Pous foot,	— — — — —					0	1	0.0875		
18	$4\frac{1}{2}$	$1\frac{2}{3}$	$1\frac{2}{11}$	$1\frac{1}{2}$	$1\frac{1}{3}$	Pygme, cubit	— — — — —					0	1	1.5984 $\frac{1}{2}$	
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{5}$	Pygon	— — — — —				0	1	3.109 $\frac{3}{4}$	
24	6	$2\frac{2}{3}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Pecus, cubit larger	— — — — —			0	1	6.13125	
96	24	$9\frac{3}{4}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	4^4	4	Orgya, pace	— — — — —			0	6	0.525
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Stadium Aulus > furlong	—	100	4	4.5	
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8	Million, Mile	—	805	5	0

N. B. Two sorts of long measures were used in Greece, *viz.* the Olympic and the Pythic. The former was used in Peloponnesus, Attica, Sicily, and the Greek cities in Italy. The latter was used in Theffaly, Illyria, Phocis, and Thraee, and at Marfeilles in Gaul.

The Olympic foot, properly called Greek, according to Dr. Hutton, contains 12.108 English inches,

Folkes — 12.072

Cavallo — 12.084

The Pythic foot, called also natural foot, according to Hutton — 9.768

Pauçon — 9.731

Hence it appears, that the Olympic stadium is $201\frac{1}{2}$ English yards, nearly; and the Pythic or Delphic stadium, $162\frac{1}{2}$ yards, nearly; and the other measures in proportion.

The Phyleterian foot is the Pythic cubit, or $1\frac{1}{2}$ Pythic foot. The Macedonian foot was 13.92 English inches; and the Sicilian foot of Archimedes, 8.76 English inches. See TABLE VII.

TABLE III.

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TABLE III.—Jewish Long or Itinerary Measures.

						Eng. Miles	Paces	Feet	Dues	
Cubit						—	0	0	1.24	
400	Stadium					—	0	145	4.6	
2000	5	Sab. day's journey				—	0	729	3.0	
4000	10	2	Eastern mile			—	1	423	1.0	
12000	30	6	3	Parasang		—	4	153	3.0	
96000	240	48	24	8	A day's journey		—	33	172	4.0

TABLE IV.—Roman Long Measures reduced to English.

								Engl. Paces	Feet	Inch.	Dues			
Digitus transversus								—	0	0	0.725 $\frac{1}{2}$			
1 $\frac{1}{3}$	Uncia, or Inch							—	0	0	0.967			
4	3	Palma minor					—	0	0	2.901				
16	12	4	Pes, or Foot				—	0	0	11.604				
20	15	5	1 $\frac{1}{4}$	Palmipes			—	0	1	2.505				
24	18	6	1 $\frac{1}{2}$	1 $\frac{1}{5}$	Cubitus		—	0	1	5.406				
40	30	10	2 $\frac{1}{2}$	2	1 $\frac{2}{3}$	Gradus		—	0	2	5.01			
80	60	20	5	4	3 $\frac{1}{2}$	2	Passus		—	0	4	10.02		
10000	7500	2500	625	500	416 $\frac{2}{3}$	250	125	Stadium		—	120	4	4.5	
80000	60000	20000	5000	4000	3333 $\frac{1}{3}$	2000	1000	8	Milliare		—	967	0	0

N.B. The Roman measures began with 6 scrupula = 1 sicilicum; 8 scrupula = 1 duellum; 1 $\frac{1}{2}$ duellum = 1 feminaria; and 18 scrupula = 1 digitus. Two passus were equal to 1 decempeda.

TABLE V.—Proportions of several long Measures to each other, by M. Picard.

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) supposed	696
The English foot	675 $\frac{1}{2}$
The Paris foot	720
The Amsterdamb foot, from that of Leyden, by Snellius	629
The Danish foot (two whereof make the Danish ell)	701 $\frac{9}{17}$
The Swedish foot	658 $\frac{1}{4}$
The Brussels foot	609 $\frac{3}{5}$
The Dantzick foot, from Hevelius's Selenographia	636
The Lyons foot, by M. Auzout	757 $\frac{2}{3}$
The Bologna foot, by the same	843
The braccio of Florence, by the same, and father Merfenne	1290
The palm of the architects at Rome, according to the observations of Messrs. Picard and Auzout	494 $\frac{7}{8}$

The Roman foot in the Capitol, examined by Messrs. Picard and Auzout	653 or 653 $\frac{1}{2}$
The same from the Greek foot	652
From the vineyard Mattei	657 $\frac{1}{2}$
From the palm	658 $\frac{1}{4}$
From the pavement of the Pantheon, supposed to contain 10 Roman feet	653
From a slip of marble in the same pavement, supposed to contain 3 Roman feet	650
From the pyramid of Cestius, supposed to contain 95 Roman feet	653 $\frac{1}{2}$
From the diameters of the columns in the arch of Septimius Severus	653 $\frac{1}{2}$
From a slip of porphyry in the pavement of the Pantheon	653 $\frac{1}{2}$

See on this subject Phil. Transf. vol. li. art. 69. p. 774. For other measures, see FOOT.

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TABLE VI.—Proportions of the long Measures of several Nations to the English Foot, taken from Messrs. Greaves, Auzout, Picard, and Eifenchmid.

The English standard foot being divided into 1000 equal parts, the other measures will have the proportions to it which follow :

	Feet.	Inches.
English foot	1000	12
Paris foot	1068	12.816
Venetian foot	1162	13.944
Rhinland foot	1033	12.396
Straßburg foot	952	11.424
Norimberg foot	1000	12
Dantzick foot	944	11.328
Danish foot	1042	12.504
Swedish foot	977 ³ / ₄	11.733
Derahor cubit of Cairo	1824	21.888
Persian arith	3197	38.364
Greater Turkish pike	2200	26.4
Lesser Turkish pike	2131	25.572
Braccio at Florence	1913	22.956
Braccio for woollen at Sienna	1242	14.904
Braccio for linen at Sienna	1974	23.688
Canna at Naples	6880	82.56
Vera at Almeria and Gibraltar	2760	33.12
Palmò di Archtetti at Rome	7320	87.84
Fanna di Archtetti	7320	87.84
Palmò di bracchio di mercantia	695 ¹ / ₂	8.346
Genoa palm	815	9.78
Bolognian foot	1250	15
Antwerp ell	2283	27.396
Amsterdam ell	2268	27.216
Leyden ell	2260	27.12
Paris draper's ell	3929	47.148
Paris mercer's ell	3937	47.244

TABLE VII.—Ancient Measures taken from Folkes, Raper, Shuckburgh, Hutton, Cavallo, and others.

Arabian, foot	1.095	Engl. H.
Babylonian, foot	1.144	H.
	1.135	H.
Drusian, foot	1.090	H.
Egyptian, foot	1.421	H.
Egyptian, stadium	730.8	
Greek, foot	1.009	H.
	1.006	} Folkes, 1 ¹ / ₄ Roman f.
	1.007	
	1.007	
Greek, phyleterian foot	1.167	H.
Hebrew, foot	1.212	H.
Hebrew, cubit	1.817	H.
Hebrew, sacred cubit	2.002	H.
Hebrew, great cubit	= 6 common cubits.	H.
Macedonian, foot	1.160	H.
Natural foot	.814	H.
Ptolemaic = Greek foot		H.
Roman, foot	.970	Bernard.
	.967	Picard and Greaves.
	.966	} Folkes.
	.967	

Roman, foot	.970	before Titus. Raper.
	.965	after Titus. Raper.
	.9672	from rules. Sh.
	.9681	from buildings. Sh.
	.9696	from a stone. Sh.
	.967	H.

Roman mile of Pliny	4840.5	C.
Roman mile of Strabo	4903.	
Sicilian foot of Archimedes	.730	H.

The length of the Roman foot in inches is stated as follows :

By Bernard	11.640	English inches.
By Picard and Hutton	11.604	
By Folkes	11.592	
By Raper (before Titus)	11.640	
By the same (after Titus)	11.580	
By Schuckburgh, from rules	11.6064	
By the same, from buildings	11.6172	
By the same, from a tomb-stone	11.6352	

N.B. Hence, 11.6 English inches seem to be a medium ; and, therefore, the Roman mile = 1611 English yards, being 149 yards less than the English mile. See FOOT.

TABLE VIII.—Ancient Greek superficial Measures. Olympic Land Measure.

36 Olympic square feet	=	1 Hexapodon.
6 Hexapoda	=	1 Hemihectos.
2 Hemihecti	=	1 Hectos or Modius.
6 Modii	=	1 Medimnus or Jugerum.

Hence it appears, that the Olympic jugerum was equal to 103 English perches, or nearly ⁵/₈ths of an acre.

Pythic Land Measure.

1666 ² / ₃ Square cubits	=	1 Hemihectos.
2 Hemihecti	=	1 Modius.
6 Modii	=	1 Medimnus or Jugerum.

Hence the Pythic jugerum appears to have been equal to 109 English perches, or nearly ¹¹/₁₀ths of an acre.

N.B. The plethron, or acre, is said by some to contain 1444, by others 10,000 square feet ; and aroura, the half of the plethron. The aroura of the Egyptians was the square of 100 cubits.

TABLE IX.—Ancient Greek Corn Measure.

2 Xestes	=	1 Chœnix.
4 Chœnices	=	1 Hemihectos.
1 ¹ / ₂ Hemihectos	=	1 Tetarlon.
2 Hemihecti	=	1 Modius.
6 Modii	=	1 Medimnus or Achana.

Paucetron states the medimnus to have been 3¹/₂ French boisseaux = 1.27 English bushels, and the inferior measures in proportion.

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TABLE X.—Attic Dry Measures reduced to English.

Cochliarion						Pots	Gals	Pins	Sol. Inch		
10	Cyathus	—	—	—	—	0	0	0	0.276 $\frac{1}{2}$		
15	1 $\frac{1}{2}$	Oxybaphon	—	—	—	0	0	0	2.763 $\frac{1}{2}$		
60	6	4	Cotylus	—	—	0	0	0	16.579		
120	12	8	2	Xestes, sextary	—	0	0	0	33.158		
180	18	12	3	1 $\frac{1}{2}$	Chœnix	—	0	1	15.705 $\frac{1}{2}$		
8640	864	576	144	72	48	Medimnus	—	4	0	6	3.501

TABLE XI.—Attic Measures of Capacity for Liquids, reduced to the English Wine Measure.

Cochliarion						Gall.	Pints	Sol. Inch.	Dec.			
2	Cheme	—	—	—	—	0	$\frac{1}{12}$	0	0.0356 $\frac{1}{2}$			
2 $\frac{1}{2}$	1 $\frac{1}{4}$	Myflon	—	—	—	0	$\frac{1}{8}$	0	0.0894 $\frac{1}{4}$			
5	2 $\frac{1}{2}$	2	Concha	—	—	0	$\frac{1}{4}$	0	0.178 $\frac{1}{2}$			
10	5	4	2	Cyathus	—	0	$\frac{1}{2}$	0	0.356 $\frac{1}{2}$			
15	7 $\frac{1}{2}$	6	3	1 $\frac{1}{2}$	Oxybaphon	—	0	$\frac{1}{2}$	0.535 $\frac{1}{2}$			
60	30	24	12	6	4	Cotylus	—	0	2.141 $\frac{1}{2}$			
120	60	48	24	12	8	2	Xestes, sextary	0	1	4.283		
720	360	288	144	72	48	12	6	Chous, congius	0	6	25.698	
8640	4320	3456	1728	864	576	144	7	12	Metretes, amphora	10	2	19.626

Others reckon 6 choi = 1 amphoreus, and 2 amphorei = 1 keramion or metretes. The keramion is stated by Pauſon to have been equal to 35 French pints, or 8 $\frac{1}{2}$ English gallons, and the other measures in proportion.

TABLE XII.—Measures of Capacity for Liquids, reduced to English Wine Measure.

Ligula						Gall.	Pints.	Sol. Inch.	Dec.				
4	Cyathus	—	—	—	—	0	$\frac{1}{12}$	0	0.117 $\frac{1}{2}$				
6	1 $\frac{1}{2}$	Acetabulum	—	—	—	0	$\frac{1}{8}$	0	0.704 $\frac{1}{2}$				
12	3	2	Quartarius	—	—	0	$\frac{1}{4}$	0	1.409				
24	6	4	2	Hemina	—	0	$\frac{1}{2}$	0	2.818				
48	12	8	4	2	Sextarius	0	1	0	5.636				
288	72	48	24	12	6	Congius	0	7	0	4.942			
1152	288	192	96	48	24	4	Urna	3	4 $\frac{1}{2}$	0	5.33		
2304	576	384	192	96	48	8	2	Amphora	7	1	0	10.66	
46080	11520	7680	3840	1920	960	160	40	20	Culeus	143	3	0	11.095

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TABLE XIII.—Jewish Dry Measures reduced to English.

						Pecks.	Gall.	Pints.	Sol. Inch.	
Gachal	—	—	—	—	—	0	0	0 1 1/2	0.031	
20	Cab	—	—	—	—	0	0	2 1/2	0.073	
36	1 1/5	Gomor	—	—	—	0	0	5 1/10	1.211	
120	6	3 1/3	Seah	—	—	1	0	1	4.036	
360	18	10	3	Epha	—	3	0	3	12.107	
1800	90	50	15	5	Letteeh	—	16	0	26.500	
3600	180	100	30	10	2	Chomer, coron	—	32	0	18.969

TABLE XIV.—Jewish Measures of Capacity for Liquids, reduced to English Wine Measure.

						Gall.	Pints.	Sol. Inch.		
Caph	—	—	—	—	—	0	1/8	0.177		
1 1/3	Log	—	—	—	—	0	5/8	0.211		
5 1/3	4	Cab	—	—	—	0	3 1/2	0.844		
16	12	3	Hin	—	—	1	2	2.533		
32	24	6	2	Seah	—	2	4	5.067		
96	72	18	6	3	Bath, epha	—	7	4	15.2	
960	720	180	60	30	10	Coron, chomer	—	75	5	7.625

TABLE XV.—Ancient Roman Land Measure.

100 Square Roman feet	=	1	Scrupulum of land
4 Scrupula	=	1	Sextulus
1 1/3 Sextulus	=	1	Actus
6 Sextuli or 5 Actus	=	1	Uncia of land
6 Unciæ	=	1	Square Actus
2 Square Actus	=	1	Jugerum
2 Jugera	=	1	Heredium
100 Heredia	=	1	Centuria

N. B. The actus was a slip of ground four Roman feet broad, and 120 long. The jugerum or acre was considered as an integer, and divided, like the libra or as, in the following manner :

		Jugerum contained						
		Unciæ	Square Feet.	Scrup.	Eng. Woods.	Sq. Pol.	Sq. Feet.	
1	As	12	As	28800	288	2	18	250.05
1 1/2	Deunx	11	Deunx	26400	264	2	10	183.85
5/8	Dextans	10	Dextans	24000	240	2	2	117.64
3/4	Dodrans	9	Dodrans	21600	216	1	34	51.42
2/3	Bes	8	Bes	19200	192	1	25	257.46
7/8	Septunx	7	Septunx	16800	168	1	17	191.25
1 1/2	Semis	6	Semis	14400	144	1	9	125.03
1 1/3	Quincunx	5	Quincunx	12000	120	1	1	58.82
4/3	Triens	4	Triens	9600	96	0	32	264.85
2/3	Quadrans	3	Quadrans	7200	72	0	24	198.64
1/2	Sextans	2	Sextans	4800	48	0	16	132.43
1/4	Uncia	1	Uncia	2400	24	0	8	66.21

N. B. If we take the Roman foot at 11.6 English inches (see TABLE VII.), the Roman jugerum was 5980 English square yards, or 1 acre 37 1/2 perches.

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TABLE XVI.—Roman Dry Measures reduced to English.

Ligula						Peck	Gall	Pint	Sol. Inch	Des.
						0	0	0 $\frac{1}{4}$	0.01	
4	Cyathus					0	0	0 $\frac{1}{2}$	0.04	
6	1 $\frac{1}{2}$	Acetabulum				0	0	0 $\frac{1}{2}$	0.06	
24	6	4	Hemina or Trutta			0	0	0 $\frac{1}{2}$	0.24	
48	12	8	2	Sextarius		0	0	1	0.48	
384	96	64	16	8	Semi d.	0	1	0	3.84	
768	192	108	32	16	2 Modius	1	0	0	7.68	

TABLE XVII.—Ancient Roman Liquid Measures.

6 Sextarii	= 1 Congius
4 Congii	= 1 Urna
2 Urnae	= 1 Amphora
20 Amphoræ	= 1 Dolium.

N. B. The sextarius and its divisions were used as in the preceding table. If the sextarius be, as above supposed, = 36.94 English cubic inches, the amphora will be = 7 $\frac{1}{2}$ English gallons, and the dolium = 153 $\frac{1}{2}$ English gallons.

The principal modern measures will be found either in the following tables, or under the names of the countries and towns in which they are used, or under their own appropriate titles.

TABLE XVIII.—English Long Measures, or Measures of Application.

Barley-corn

3	Inch									
9	3	Palm								
27	9	3	Span							
36	12	4	1 $\frac{1}{2}$	Foot						
54	18	6	2	1 $\frac{1}{2}$	Cubit					
108	36	12	4	3	2	Yard				
180	60	20	6 $\frac{3}{4}$	5	3 $\frac{1}{2}$	1 $\frac{2}{3}$	Pace			
216	72	24	8	6	4	2	1 $\frac{1}{5}$	Fathom		
594	198	66	22	16 $\frac{1}{2}$	11	5 $\frac{1}{2}$	3 $\frac{3}{10}$	2 $\frac{1}{2}$	Pole, or Rod	
23760	7920	2640	880	660	440	220	132	110	40	Furlong
190080	63360	21120	7040	5280	3520	1760	1056	880	320	8 Mile

N. B. To the above measures we may add a link = 7.92 inches, a chain = 792, a nail of cloth = 2 $\frac{1}{4}$, a quarter = 9, an ell = 45, and a hand = 4 inches.

TABLE XIX.—Scotch Long Measures.

An Ell	= 37.2 English inches.
A Fall	= 223.2
A Furlong	= 8928
A Mile	= 71424
A Link	= 8.928
A Chain, or Short Road	= 892.8
A Long Road	= 1339.2

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TABLE XX.—English Square or Superficial Measures.

Inches					
144	Feet				
1296	9	Yards			
3600	25	2 $\frac{2}{3}$	Paces		
39204	272 $\frac{1}{2}$	30 $\frac{1}{4}$	10.89	Poles	
1568160	10890	1210	435.6	40	Rood
6272640	43560	4840	1743.6	160	4 Acre

N. B. English square or superficial measures are raised from the yard of 36 inches, multiplied into itself; and this producing 1296 square inches in the square yard, the divisions of this are square feet and inches; and the multiples, poles, roods, and acres, as in the table. The Scotch acre is 55353.6 square feet English, or 1.27 English acre. See ACRE.

TABLE XXI.—English Dry or Corn Measures.

Solid Inches								
34 $\frac{1}{2}$	Pint							
272 $\frac{1}{4}$	8	Gallon						
544 $\frac{1}{2}$	16	2	Peck					
2178	64	8	4	Winchester Bushel				
	128	16	8	2	Strike			
	265	32	16	4	2	Carnock or coom		
17424	512	64	32	8	4	2	Seam or quarter	
	3072	384	192	48	24	12	6	Weigh
	5120	640	320	80	40	20	10	1 $\frac{2}{3}$ Laft

But if the corn gallon contain only 268.8 solid inches, the measures will be as follows :

Solid inches			
268.8	Gallon		
537.6	2	Peck	
2150.42	8	4	Winchester bushel *
17203.36	64	32	8 Quarter

According to this estimate of the corn gallon, the pint will be 33.6 solid or cubic inches, a quart = 67.2, a pottle = 134.4.

* A heaped bushel is one-third more.

N. B. Some make five quarters a weigh or load, and two weighs a laft of wheat; and others reckon ten quarters to the weigh, and twelve weighs to the laft. A bushel of wheat, at a mean, weighs 60 pounds, of barley 50, of oats 38; a chaldron of coals is 36 heaped bushels, weighing about 2988 pounds. See CHALDRON.

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English dry or corn measures are rated from the Winchester gallon, which contains 272½ solid inches, and is to hold of pure running or rain-water, nine pounds, thirteen ounces. This seems to stand on the foot of the old wine gallon, of 224 cubic inches; 12 being to 14½, as 224 to 272½. Yet by act of parliament, made 1697, it is decreed, that a round

bushel, eighteen inches and a half wide, and eight deep, is a legal Winchester bushel. But such a vessel will only hold 2150.42 cubic inches: and consequently the gallon will contain 268½ cubic inches. The divisions and multiples are in the preceding table.

TABLE XXII. — English Measures of Capacity of Liquids.

Solid or Cubic Inches.		Wine Measure.						
28.875	Pint							
231	8	Gallon						
4158	144	18						Rundlet
7276.5	252	31½	1½					Barrel
9702	336	42	2½	1½				Tierce
14553	504	63	3½	2	1½	Hoghead		
19404	672	84	4¾	2½	2	1½	Puncheon	
29106	1008	126	7	4	3	2	1½	Butt or Pipe
58212	2016	252	14	8	6	4	3	2 Tun

Solid Inches.		Ale Measure.				
35.25	Pint					
282	8	Gallon				
2256	64	8				Firkin
4512	128	16	2	Kilderkin		
9024	256	32	4	2	Barrel	
13536	384	48	6	3	1½	Hoghead

Solid Inches.		Beer Measure.					
35.25	Pint						
282	8	Gallon					
2538	72	9					Firkin
5076	144	18	2	Kilderkin			
10152	288	36	4	2	Barrel		
15228	432	54	6	3	1½	Hoghead	
30456	864	108	12	6	3	2 Butt	

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English liquid measures were originally raised from troy weight; it being enacted by several statutes that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, should weigh a gallon of wine measure; the divisions and multiples whereof were to form the other measures: at the same time it was also ordered, that there should be but one liquid measure in the kingdom; yet custom has prevailed; and there having been introduced a new weight, *viz.* the avoirdupois, we have now a second standard gallon adjusted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter standard are raised two several measures, the one for ale, the other for beer. For the method of reducing one into the other, see WEIGHT.

The sealed gallon at Guildhall, which is the standard for wines, spirits, oils, &c. is supposed to contain 231 cubic inches; and, on this supposition, the other measures raised therefrom will contain as in the preceding tables; yet, by actual experiment made in 1688, before the lord mayor and the commissioners of excise, this gallon was only found to contain 224 cubic inches; it was however agreed to continue the common supposed contents of 231 cubic inches; so that all computations stand on their old footing. Hence, as 12 is to 231, so is $14\frac{1}{2}$ to $281\frac{1}{2}$, the cubic inches in the ale gallon: but in effect the ale quart contains $70\frac{1}{2}$ cubic inches; on which principle the ale and beer gallon will be 282 cubic inches. See on this subject Phil. Transf. vol. xlii. art. 15. p. 54.

The several divisions and multiples of these measures and their proportions, are exhibited in the preceding tables.

It is conjectured, that some centuries before the conquest, a cubic foot of water weighing 1000 ounces, 32 cubic feet weighed 2000 pounds, or a ton; that the same quantity was a ton of liquids, and a hoghead eight cubic feet, or 13824 cubic inches, one sixty-third of which was 219.4 inches, or a gallon. A quarter of wheat was a quarter of a ton, weighing about 500 pounds, a bushel one-eighth of this,

equivalent to a cubic foot of water. A chaldron of coals was a ton, and weighed 2000 pounds. (Barlow, Phil. Transf. for 1740.) At present 12 wine gallons of distilled water weigh exactly 100 pounds avoirdupois.

Whereas it has been thought expedient that the quantities to be returned as and for a barrel of beer or ale brewed by the common brewer and the allowances for waste should be in all places the same, it is enacted that after the 5th day of July, 1803, every thirty-six gallons of beer or ale brewed by the common brewers in Great Britain, whether within the weekly bills of mortality or without the same, taken according to the standard of the ale-quart, four thereof to the gallon in the exchequer, shall be reckoned and returned by the gauger or other officer of excise for a barrel of beer or ale; and the allowances to be made in Great Britain to the common brewer not selling beer ale or worts in any less quantity than the whole cask, containing $4\frac{1}{2}$ gallons, whether within or without the said limits, for waste by fillings and leakage, or otherwise, out of the returns by the gaugers or other officers, shall be three barrels upon every thirty-six barrels, both of strong beer, or table beer and ale, and after that rate for any greater or less quantity. 43 Geo. III. c. 69.

TABLE XXIII.—Scotch Measures of Capacity of Liquids.

A Gill is -	-	6.462 English cubic inches.
A Mutchkin -	-	25.85
A Choppin -	-	51.7
A Pint -	-	103.4
A Quart -	-	206.8
A Gallon -	-	827.23
A Hoghead -	-	13235.7, or 16 gallons.

N.B. By the Act of Union, twelve Scotch gallons are reckoned equal to an English barrel, or 9588 cubic inches, instead of 9927.

A lippie or feed is 200.345 cubic inches.

TABLE XXIV.—French Measures, according to the Old System before the Revolution.

A Point is -	-	.0148025 English inch, or nearly $\frac{1}{735}$.
A Line -	-	.088815, or nearly $\frac{1}{112}$.
An Inch or Pouce -	-	1.06578, or $\frac{1}{93\frac{1}{2}}$, or $\frac{8}{76}$.
A Foot -	-	12.78933
An Ell or Aune -	-	46.8947, or 44 French inches, or according to Vega, 43.9
A Sonde -	-	63.9967, or 5 French feet, about $\frac{8}{9}$ English fathom.
A Toise or Fathom -	-	76.7360, or 6 French feet; formerly 76.71, Phil. Transf. for 1742.
A Perche -	-	230.2080, or 18 French feet.
A Perche, mesure royale -	-	22 French feet.
A League -	-	2282 toises, or $\frac{1}{25}$ of a degree.
A Square Inch -	-	1.13582 English square inches.
An Arpent -	-	100 square perches, about $\frac{2}{3}$ acre English, used near Paris.
An Arpent, mesure royale -	-	about $1\frac{1}{4}$ English acre.
A Cubic Inch -	-	1.21063 cubic inches English.
A Litron -	-	65.34
A Boisseau -	-	1045.44, or 16 litrons.
A Minot -	-	2090.875, or 3 boisseaux, nearly an English bushel.
A Mine -	-	4181.75, or 2 minots.
A Septier -	-	8363.5, or 2 mines, or 6912 inches French.
-	-	double for oats.
A Muid -	-	100362, or 12 septiers.

N.B. A ton of shipping contains 42 cubic feet. The aune or ell of Paris varies, being for silk stuffs 527.5 lines, or $46\frac{1}{10}$ English inches; for woollens, 526.4 French lines, or $46\frac{3}{4}$ English inches; for linens, 524 French lines, or $46\frac{1}{10}$ English inches; and it varies still more in other parts of

France. The perch, which determines the measure of the acre, varies in different parts of the country: but the arpent of wood-land is every where the same, the perch being 22 feet long; and this arpent contains 48,400 French square feet, or 6108 Eng. square yards, or one acre, one rood, one perch.

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perch. The arpent for cultivated land, in the vicinity of Paris, contains 900 square toises, or 4088 English yards, so that 43 such arpents are equal to 38 English acres nearly.

TABLE XXV.—French Measures, according to the New System, with the amended Nomenclature of Dr. Young.

Measures of Length.

	English Inches.
Millimetre - - - -	.03937
Centimetre - - - -	.39371
Decimetre - - - -	3.93710
Metre - - - -	39.37100, or 3.281 feet, or 1.09364 yds. or nearly 1 y. 1½ nail, or 443.2959 French lines, or .513074 toise.
Decametre - - - -	393.71000, or 10 yards, 2 feet, 9.7 inches.
Hecatometre - - - -	3937.10000, or 100 yards, 1 foot, 1 inch.
Chiliometre - - - -	39371.00000, or 4 furl. 213 yards, 1 foot, 10.2 inches: so that 8 chiliometres are nearly 5 miles.
Myriometre - - - -	393710.0000, or 6 miles, 1 furl. 136 yds. 0 f. 6 inch.

N. B. An inch is .0354 metres; 2441 inches 62 metres, 1000 feet nearly 305 metres.

Superficial or Square Measures.

Are, a square decametre, is -	3.95 Eng. perches, or 119.6046 square yards.
Decare - - - -	1196.0460 square yards.
Hecatare - - - -	11960.4600 square yards, or 2 acres, 1 rood, 35.4 perches.

Measures of Capacity.

	Cubic Inches English.
Millilitre - - - -	.06103
Centilitre - - - -	.61028
Decilitre - - - -	6.10280
Litre, a cubic decimetre - -	61.02800, or 2.113 wine pints.
Decalitre - - - -	610.28000, or 2.64 wine gallons.
Hecalitre - - - -	6102.80000, or 3.5317 cu- bic feet, or 26.4 wine gallons.
Chilolitre - - - -	61028.00000, or 35.3170 cu- bic feet, or 1 tun, 12 wine gallons.
Myriolitre - - - -	610280.00000, or 353.1700 cubic feet.

Solid Measure.

	Cubic Feet.
Decistre, for fire wood - -	3.5317
Stere, a cubic metre - -	35.3170
Decastere - - - -	353.1700

N. B. In order to express decimal proportions in this

new system, the following terms have been adopted. The term *Deca* prefixed denotes 10 times; *Heca*, 100 times; *Chilo*, 1000 times; and *Myrio*, 10,000 times. On the other hand, *Deci* expresses the 10th part; *Centi*, the 100th part; and *Milli*, the 1000th part: so that *Decametre* signifies 10 metres; and a *Decimetre*, the 10th part of a metre, &c. &c. The *Metre* is the element of long measures; *Are*, that of square measures; *Stere*, that of solid measures; the *Litre* is the element of all measures of capacity; and the *Gramme*, which is the weight of a cubic centimetre of distilled water, is the element for all weights. (See WEIGHT.) For the principle on which this system of measures is founded, see STANDARD. See Dr. Young's Philof. vol. ii. Kelly's Un. Cambist. vol. ii.

TABLE XXVI.—Modern Measures of various Countries compared with those of England.

Altdorf, foot - - -	.775 Engl. H.
Amsterdam, foot - -	.927 H. .930 C.
Amsterdam, ell - -	.931 Howard.
Ancona, foot - - -	2.233 C.
Antwerp, foot - - -	1.282 H.
Aquileia, foot - - -	.940 H.
Arles, foot - - -	1.128 H.
Augsburg, foot - - -	.888 H.
Avignon = Arles.	.972 H.
Barcelona, foot - - -	.992 H.
Basse, foot - - -	.944 H.
Bavarian, foot - - -	.968 Beigel. See Munich.
Bergamo, foot - - -	1.431 H.
Berlin, foot - - -	.992 H.
Bern, foot - - -	.962 Howard.
Besançon, foot - - -	1.015 H.
Bologna, foot - - -	1.244 H. 1.250 C.
Bourg en Bresse, foot - -	1.030 H.
Brabant, ell, in Germany	2.268 V.
Bremen, foot - - -	.955 H.
Brescia, foot - - -	1.560 H.
Brescian, braccio - - -	2.092 C.
Breslau, foot - - -	1.125 H.
Bruges, foot - - -	.749 H.
Brussels, foot - - -	.902 H. .954 V.
Brussels, greater ell - -	2.278 V.
Brussels, lesser ell - -	2.245 V.
Castilian, vara - - -	2.746 C.
Chambery, foot - - -	1.107 H.
China, mathematical foot	1.127 H.
China, imperial foot - -	1.051 H. 1.050 C.
Chinese, li - - -	606. C.
Cologne, foot - - -	.903 H.
Constantinople, foot - -	2.195 } H. 1.165 }
Copenhagen, foot - - -	1.049 H.
Cracau, foot - - -	1.169 H. V.
Cracau, greater ell - -	2.024 V.
Cracau, smaller ell - -	1.855 V.
Dantzic, foot - - -	.923 H.
Dauphiné, foot - - -	1.119 H.
Delft, foot - - -	.547 H.
Denmark, foot - - -	1.047 H.

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MEASURES.

TABLE XXVII.—A Comparison of the Foot, and other Measures of Length in different Countries; namely, the Number of Feet, &c. of each Place, corresponding to 100 English Feet; and also the Length of a single Measure of each denomination in English Inches, and Hundredths of an Inch.

		Number of each equal to 100 English Feet.	Length of a single Measure of each Sort.			Number of each equal to 100 English Feet.	Length of a single Measure of each Sort.
			E. Inches.				E. Inches.
Aix la Chapelle	Feet	105.18	11.41	Hamburgh	Feet	106.28	11.29
Amsterdam	ditto	107.62	11.15	Rhineland ditto		97.17	12.35
Anspach	ditto	102.38	11.72	Claftra		17.71	67.74
Ancona	ditto	78.02	15.38	Mafch Ruthes		7.59	158.06
Antwerp	ditto	106.76	11.24	Geelt ditto		6.64	180.64
Aquileia	ditto	88.69	13.53	Rhineland ditto		8.10	148.20
Augsburg	ditto	103	11.65	Hanover	Feet	104.80	11.45
Bafil	ditto	102.22	11.74	Ruthes		6.50	183.20
Bavaria	ditto	105.08	11.42	Harlem	Feet	106.67	11.25
Bergamo	ditto	69.89	17.17	Heidelberg	ditto	109.48	10.96
Berlin	ditto	98.44	12.19	Hildesheim	ditto	108.60	11.05
Bern	ditto	103.98	11.54	Holftein	(See Copenhagen.)		
Bologna	ditto	80.05	14.99	Inspruck	Feet	96	12.50
Bremen	ditto	105.45	11.38	Konigsberg	ditto	99.09	12.11
Brescia	Bracci	64.10	18.72	Leghorn	(See Florence.)		
Breflaw	Feet	107.24	11.19	Leipfic	Common Feet	108.01	11.11
Brunfwick	ditto	106.85	11.23		Builders' ditto	107.81	11.13
Bruffels	ditto	104.80	11.45	Leyden	ditto	97.24	12.34
Cadiz	(See Spain.)			Liege	ditto	106	11.32
Cagliari	Palmi	150.52	7.97	Lindau	Common Feet	105.26	11.40
Calemberg	Feet	104.34	11.50		Long ditto	96.77	12.40
Carrara	Palmi	125	9.60	Lifbon	Feet	92.78	12.96
Caftile	(See Spain.)				Palmi	139.17	8.64
Chamberry	Feet	90.36	13.28	Lorraine	Feet	106.20	11.30
China	Mathematical Feet	91.46	13.12	Lubec	ditto	104.80	11.45
	Builders' ditto	94.41	12.71		Ruthes	6.55	183.20
	Tradefmen's ditto	90.08	13.32	Lunenburg	Feet	104.80	11.45
	Land Survey. do.	95.39	12.58	Madrid	(See Spain.)		
Cleves	Feet	103.18	11.63	Magdeburg	Feet	107.52	11.16
Cologne	ditto	110.80	10.83	Malta	ditto	107.43	11.17
Copenhagen	Legal Feet	97.17	12.35	Manheim	ditto	105.39	11.41
	Fathoms	16.20	74.10	Mantua	Bracci	65.75	18.25
	Ruthes	9.71	123.50	Maftricht	Feet	108.60	11.05
Cracow	Feet	85.53	14.03	Mecklenburg	(See Hanover.)		
Dantzic	ditto	106.28	11.29	Mentz	Feet	101.26	11.85
	Ruthes	7.08	169.35	Middleburg	ditto	101.61	11.81
Dordrecht	Feet	84.74	14.16	Milan	ditto	76.82	15.62
Dresden	ditto	107.62	11.14		Bracci	62.34	19.25
Emden	ditto	102.92	11.66	Monaco	Feet	129.73	9.25
England	ditto	100	12	Mofcow	ditto	91.12	13.17
	Yards	33.33	36	Naples	Palmi	115.62	10.38
	Poles	6.06	198	Neufchatel	Feet	101.61	11.81
Ferrara	Feet	75.95	15.80	Nuremberg	ditto	100.34	11.96
	Pertiche	11.11	108	Oldenburg	ditto	103	11.65
Florence	Builders' Bracci	55.55	21.60	Ofnaburg	ditto	109.09	11
France	Pieds de Roi	93.89	12.78	Padua	ditto	86.15	13.93
	Toifes	15.65	76.68	Palermo	Palmi	125.93	9.53
	Metres	30.48	39.37	Paris	(See France.)		
Francfort	Feet	106.48	11.27	Parma	Surveyors' Bracci	56.23	21.34
Geneva	ditto	62.50	19.20	Pavia	ditto	65.57	18.30
Genoa	Palmi	123.45	9.72	Persia	Arifh	31.36	38.27
Gottingen	Feet	104.80	11.45	Pomerania	Feet	104.34	11.50
Gotha	ditto	106	11.32	Portugal	(See Lifbon.)		
Groningen	ditto	104.44	11.49	Prague	Feet	101	11.88

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TABLE XXVIII.—A Comparison of the Itinerary Measures of different Countries, exhibiting the Number of each, answering to 100 English Miles; also the Length of a single Measure of each Sort, in English Yards.

	Number of each equal to 100 English Feet.	Length of a single Measure of each Sort.
		E. Inches.
Ratisbon - - (See Bavaria.)		
Ratzburg - - Feet - -	104.80	11.45
Revel - - ditto - -	113.96	10.53
Reggio - - Bracci - -	57.55	20.85
Rhineland - - Feet - -	97.17	12.35
Riga - - ditto - -	111.21	10.79
Rimini - - Bracci - -	56.10	21.39
Rome - - Feet - -	103.45	11.60
Builders' Canne	13.65	87.92
Palmi - -	136.49	8.79
Rostock - - Feet - -	105.45	11.38
Rotterdam - - (See Rhineland.)		
Russia - - Arsheens - -	42.86	28
Safhes - -	14.28	84
Feet - -	87.27	13.75
Sardinia - - Palmi - -	122.70	9.78
Savoy - - (See Chambrery.)		
Sienna - - Feet - -	80.75	14.86
Sicily - - (See Palermo.)		
Silefia - - Ruthes - -	7.06	170
Spain - - Feet - -	107.91	11.12
Toefas - -	17.98	66.72
Palmos - -	143.88	8.34
Stade - - Feet - -	104.80	11.45
Stettin - - ditto - -	107.91	11.12
Stockholm - - (See Sweden.)		
Strasbourg - - Feet - -	105.35	11.39
Land ditto - -	103.28	11.62
(See also France.)		
Stutgard - - (See Wurtemberg.)		
Sweden - - Feet - -	102.66	11.69
Fathoms - -	17.11	70.14
Rods - -	6.43	187.04
Trent - - Feet - -	83.28	14.41
Turin - - ditto - -	94.34	12.72
Ulm - - ditto - -	105.35	11.39
Utrecht - - ditto - -	111.82	10.74
Venice - - ditto - -	87.72	13.40
Verona - - ditto - -	89.55	13.68
Vicenza - - ditto - -	88.04	13.63
Vienna - - ditto - -	96.39	12.45
Warfaw - - ditto - -	85.53	14.03
Wismar - - ditto - -	103.63	11.58
Wurtemberg - - ditto - -	104.80	11.45
Zell - - (See Hanover.)		
Ziriczee - - ditto - -	98.28	12.21
Zurich - - Feet - -	101.60	11.81
Ruthes - -	10.16	118.10
Fathoms - -	16.32	73.50

	Number of each equal to 100 Eng. Miles.	Length of a single Measure of each Sort.
		Eng. Yards.
Arabia - - Miles - -	81.93	2148
Bohemia - - ditto - -	17.36	10137
Brabant - - ditto - -	28.93	6082
Burgundy - - ditto - -	28.46	6183
China - - Lis - -	279.80	629
Denmark - - Miles - -	21.35	8244
England - - ditto - -	100	1760
ditto geographical	86.91	2025
Flanders - - Miles - -	25.62	6869
France - - Leagues, Astro- } nomical - - } ditto Marine } ditto legal of } 2000 Toises. }	36.21	4860
ditto legal of } 2000 Toises. }	28.97	6075
ditto legal of } 2000 Toises. }	41.28	4263
Germany - - Miles, geograph.	21.72	8101
ditto, Long - -	17.38	10126
ditto, Short - -	25.66	6859
Hamburgh - - Miles - -	21.35	8244
Hanover - - ditto - -	15.23	11559
Hesse - - ditto - -	16.68	10547
Holland - - ditto - -	27.52	6395
Hungary - - ditto - -	19.31	9113
Ireland - - ditto - -	57.93	3038
Italy - - ditto - -	86.91	2025
Lithuania - - ditto - -	18	9781
Oldenburgh - - ditto - -	16.26	10820
Poland - - Miles, Short	28.97	6075
ditto, Long - -	21.72	8101
Portugal - - Leguas - -	26.03	6760
Prussia - - Miles - -	20.78	8468
Rome - - Ancient Miles of } 8 Stadia - - } Modern Miles - - }	109.18	1612
Modern Miles - - }	86.91	2025
Russia - - Versts - -	150.81	1167
Saxony - - Miles - -	17.76	9905
Scotland - - ditto - -	88.70	1984
Silefia - - ditto - -	27.67	7083
Spain - - Leguas common } of 8000 Varas } ditto Legal, of } 5000 Varas }	23.73	7416
ditto Legal, of } 5000 Varas }	37.97	4635
Swabia - - Miles - -	17.38	10126
Sweden - - ditto - -	15.04	11700
Switzerland - - ditto - -	19.23	9153
Turkey - - Berries - -	96.38	1826
Westphalia - - Miles - -	14.56	12151

MEASURES.

TABLE XXIX. Shewing the Contents of a Square Foot of different Countries, in English Square Inches, and hundredth Parts of an Inch.

	English Square Inches.
A Square Foot of Amsterdam contains	124.32
Antwerp	126.34
Berlin	148.59
Bern	133.23
Bologna	224.70
Bremen	129.50
Denmark or Rhineland	152.52
Dantzic	127.46
Dresden	124.10
England	144.00
France	163.32
Hamburgh	127.46
Hanover	131.10
Konigsberg	146.65
Leipfic	123.43
Lisbon	167.96
Milan	243.98
Nuremberg	143.04
Osnaburg	121.00
Rome	134.56
Spain	123.65
Sweden	136.65
Turin	161.80
Venice	187.13
Vienna	155.00
Zurich	139.42
A French Square Metre	1550.00

TABLE XXX.—Shewing the Contents of a Cubic Foot of different Countries, in English Cubic Inches, and hundredth Parts of an Inch.

	English Cubic Inches.
A Cubic Foot of Amsterdam contains	1386.20
Antwerp	1420.03
Berlin	1811.39
Bern	1536.80
Bologne	3368.25
Bremen	1473.76
Denmark or Rhineland	1883.65
Dantzic	1439.07
Dresden	1382.50
England	1728.00
France	2087.34
Hamburgh	1439.07
Hanover	1501.12
Konigsberg	1775.96
Leipfic	1371.33
Lisbon	2177.80
Milan	3812.98
Nuremberg	1710.76
Osnaburgh	1331.00
Rome	1560.90
Spain	1375.04
Sweden	1597.52
Turin	2058.07
Venice	2560.10
Vienna	1929.78
Zurich	1647.20
A French Cubic Metre	61023.50

TABLE XXXI.—A Comparison of the Corn Measures of different Places; namely, the Number of Measures of each Place, corresponding to 10 Quarters, or 80 English Bushels, Winchester Measure; also, the Contents of a single Measure in English Cubic Inches.

	Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.
Abbeville	18.37	9364
Aren	32.23	5337
Aix-la-Chapelle	117.73	1461
Alenmaar	34.80	4943
Alexandria	17.94	9587
	16.51	10418
Algiers	141.10	1219
Alicant	11.44	15038
Altona	(See Hamburgh.)	
Amersfort	12.30	13986
Amiens	85.79	2005
Amsterdam	26.06	6596
	34.76	4947
	104.28	1649
	20.85	8245
Ancona	10.32	16662
Antwerp	36.55	4705
Apulia	55.11	3121
Archangel	14.46	11888
Arles	47.40	3628
Arnheim	21.27	8087
Augsburg	6.41	26812
Avignon	30.65	5612
Azores	235.30	731
Barcelona	39.08	4401
Basil	21.93	7844
Bayonne	68.72	2503
Bergamo	17.18	10008
Bergen	(See Copenhagen.)	
Bergen-op-Zoom	60.98	2821
Berlin	54.09	3180
Bern	16.76	10260
Beauvais	1.45	118529
Bilboa	47.19	3645
Boileduc	19.84	8671
Bologna	38.20	4503
Botzen or Bolfano	25.84	6657
Boulogne	16.32	10535
Bourdeaux	36.73	4682
Breda	32.41	5806
Bremen	39.64	4339
Breslaw	40.32	4266
Brest	2.04	84200
Brille	39.22	4385
Bruges	16.92	10164
Brunswick	90.62	1898
	9.06	18980
Brussels	24.17	7117
Cadiz	50	3439
Calabria	55.15	3119
Calais	16.95	10144
Campan	24.10	7137
Candia	18.52	9288
Cassel	19.75	8710
Castile	49.74	3458

Cette

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		Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.			Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.
			Cub. Inch.				(Cub. Inch.
Cette	- - Setiers	42.98	4002	Hanau	- - Malters	25.04	6868
Cleves	- - Malters	15.70	10954	Hanover	- - ditto	15.10	11388
Cologne	- - ditto	17.39	9892	Harderwick	- - Mudden	28.87	5957
Colberg	- - Scheffels	56.72	3032	Harlem	- - Sacks	36.80	4673
Constantinople	- - Kiflos	85.02	2023	Harlingen	- - Mudden	31.93	5386
Copenhagen	- - Toende	20.26	8489	Havre-de-Grace	- - Boiffeaux	81.55	2109
Corfu	- - Moggi	23.21	6097	Heidelberg	- - Malters	27.37	6285
Corfica	- - Stajo	28.60	6014	Heufden	- - Mudden	16.69	10305
Corunna	- - Ferrados	174.44	986	Hildefheim	- - Scheffels	54.36	3164
Culm	- - Scheffels	51.37	3348	Holftein	- - Tonnen	20.26	8489
Creutznach	- - Malters	19.38	8874	Honfleur	- - Boiffeaux	71.96	2390
Cyprus	- - Medimni	38.62	4453	Hoorn	- - Sacks	42.50	4047
Dantzic	- - Scheffels	57.95	2968	Hufum	- - Rye Tonnes	18.34	9378
Darmstadt	- - ditto	28.14	6111		- - Wheat ditto	18.25	9426
Denmark	- - (See Copenhagen.)			Ingolstadt	- - Schaff	2.70	63536
Delft	- - Sacks	28	6141	Ireland	- - Barrels	20	8600
Deventer	- - Mudden	34.80	4942	Kiel	- - Tonnes	23.78	7232
Dieppe	- - Mines	27.55	6243		- - Scheffels	71.34	2411
Dixmude	- - Rafieres	29.51	5821	Konigfberg	- - New Scheffels	54.56	3152
Dordrecht	- - Great Sacks	23.17	7428	Laland	- - Tonnen	20.52	8380
	- - Little ditto	30.91	5565	Lawenburg	- - Sacks	16.43	10466
Dresden	- - Scheffels	26.64	6456	Leghorn	- - Staji	114.60	1501
Dunkirk	- - Sea Rafieres	17.40	9884		- - Sacchi	38.20	4503
	- - Land ditto	19.57	8786	Leipfic	- - Scheffels	20.28	8481
Elbing	- - Scheffels	58	2965	Lewarden	- - Mudden	31.93	5386
Embden	- - Tonnen	14.70	11697	Leyden	- - Sacks	42.47	4049
	- - Verps	58.80	2924	Libourne	- - Sacks	33.86	5079
England	- - Winchefter Bufh.	80	2150	Liebau	- - Loofs	45	3822
	- - ditto Quarters	10	17200	Lifbon	- - Alquieres	210.52	817
Enkhuyfen	- - Mudden	21.25	8095		- - Fanegas	52.63	3268
	- - Sacks	42.50	4048	Liege	- - Setiers	94.14	1827
Erfurt	- - Scheffels	50.01	3430	Lille	- - Razieres	39.64	4339
Faro	- - Alquieres	174.26	987	Lubec	- - Wheat Scheffels	84.27	2041
Femerren	- - Scheffels	74.98	2294		- - Oats ditto	71.81	2395
Ferrara	- - Stari	93.22	1845	Lucca	- - Staji	116.85	1472
Ferrol	- - Ferrados	155.80	1104	Lunburgh	- - (See Hanover.)		
Florence	- - Stari	118.70	1449	Lyons	- - Anées	14.69	11706
Flushing	- - Sacks	37.67	4566	Madeira	- - Alquieres	251.46	684
France	- - Old System. (See Paris.)			Magdeburgh	- - Scheffels	54.56	3152
	- - New Sys. Litres	2818.70	61	Majorca	- - Quarteras	41.83	4112
	- - Decalitres	281.87	610	Malaga	- - Fanegas	45.46	3783
	- - Hectalitres	28.18	6102	Malta	- - Salme	10.15	16930
Francfort	- - Malters	26.10	6590	Manheim	- - Malters	27.37	6285
Friderickstadt	- - Tonnen	21.74	7913	Mantua	- - Stari	80.94	2125
Galicia	- - Ferrados	149.16	1153	Marfeilles	- - Charges	18.27	9411
Geneva	- - Coupes	36.29	4739	Mastricht	- - Setiers	124.38	1383
Genoa	- - Mina	23.30	7382	Mentz	- - Malters	30.94	5558
Ghent	- - Halfter	54.12	3178	Mecklenburgh	- - Scheffels	66.39	2591
Goes	- - Sacks	38.70	4444	Memel	- - ditto	58.22	2954
Gluckstadt	- - Tonnen	22	7815	Middleburg	- - Sacks	40.08	4291
Gouda	- - Sacks	27.09	6348	Milan	- - Moggi	20.37	8444
Gorcum	- - Mudden	16.67	10314		- - Staji	162.96	1055
Gravelines	- - Rafieres	21.29	8080	Modena	- - ditto	40	4297
Greece	- - Medimni	71.96	2390	Montpellier	- - Setiers	53.21	3232
Greifswald	- - Scheffels	72.36	2377	Morlaix	- - Boiffeaux	52.56	3272
Groningen	- - Mudden	31.93	5386	Munich	- - Scheffels	7.74	22130
Hague (The)	- - Sacks	27.06	6356	Muyden	- - Sacks	42.50	4048
Hamburgh	- - Scheffels	26.76	6426	Nancy	- - Reals	14.70	11700
	- - Fafs	53.52	3213	Nantes	- - Cartes	58.80	2925
	- - Himten	107.04	1606	Naples	- - Setiers	19.68	8739
					- - Tomoli	55.09	3122

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		Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.
Narva	Tonnes	17.38	9893
Naumburg	Scheffels	36.50	4712
Negropont	Kiflos	93.02	1849
Nice	Staji	70.46	2441
Nieuport	Razieres	16.93	10157
Ninteguen	Mouvers	21.04	8181
Nuremberg	Malters	16.86	10200
Oldenburg	Tonnen	17.28	9946
Oneglia	Mine	23.78	7233
Opont	Alquieres	163.66	1051
Osenburg	Scheffels	98.12	1753
Oskend	Razieres	16.02	10733
Ovielo	Fanegas	37.51	4585
Paris	Setiers	18.38	9360
	Boisseaux	220.52	780
Passau	Sechsling	8.83	19465
Patras	Stare	34.31	5012
	Bachels	102.93	1671
Pernau	Tonnen	22.25	7729
Perfia	Artabas	42.85	4013
Poland	Corzees	55.13	3120
Prague	Stricks	26.39	6516
Ratisbon	Maafs	10.64	16171
Revel	Tonnen	23.83	7219
Riga	Loofs	43.24	3978
	Tonnen	21.62	7956
Rochelle	Boisseaux	85.70	2007
Rome	Rubbi	10.17	16904
	Quarti	40.70	4226
Rostock	Scheffels	79.40	2166
Rotterdam	Sacks	27.04	6361
	Hoeds	2.53	67850
Rouen	Setiers	15.75	10920
	Boisseaux	126	1365
Russia	Chetwer	13.82	12448
St. Andero	Fanegas	51.95	3311
St. Gall	Charges	38.71	4443
St. Maloes	Boisseaux	63.77	2697
St. Omer	Rafiares	21.77	7900
St. Sebastian	Fanegas	47.12	3650
St. Valery	Setiers	18.38	9356
Sardinia	Starelli	57.56	2988
Schiedam	Sacks	27.04	6360
Scotland	Wheat Firlots	78.28	2197
	Barley ditto	53.66	3205
Sleswig	Tonnen	20.19	8520
Seville	(See Spain.)		
Sicily	Salme Grosse	8.18	21014
	Salme Generale	10.18	16886
Smyrna	Killos	80.34	2141
Spain	Fanegas	50.01	3439
	Cahizes	4.16	41268
Stettin	Scheffels	54.09	3180
Stolberg	Viertels	61.30	2806
Stralfund	Tonnen	24.11	7134
	Scheffels	72.33	2378
Sweden	Tunnor	19.24	8940
	ditto (with good measure)	17.10	10058
Tonningen	Tonnen	23.20	7413
Tortofa	Quarteras	31.77	5414

		Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.
Toulon	Emmes	79	2178
Trielle	Stari	38.04	4521
Tripoli	Callifi	8 69	19780
Tunis	ditto	7 87	21855
Turin	Sacchi	24.52	7015
	Staji	73.56	2338
Ulm	Immis	12.26	14021
Utrecht	Mudden	24.16	7117
Valencia	Cahizes	17.13	10037
Vannes	Tonneaux	1.84	93556
Venice	Staji	34.78	4945
Verona	Minelli	76.41	2251
Viana	Alquieres	173.88	989
Vienna	Metzen	45 83	3753
Weimar	Scheffels	31.67	5430
Wisnar	ditto	73.66	2336
Wolgast	ditto	69.38	2479
Wurtemberg	ditto	53.28	3228
Zant	Barrili	76.41	2251
Zell	(See Hanover.)		
Ziriczee	Sacks	36.28	4741
Zurich	Mutten	34.07	5048
Zwoll	Sacks	25.16	6836

TABLE XXXII.—A Comparison of the Liquid Measures of different Places; namely, the Number of Measures of each Place, corresponding to 100 English Gallons, Wine Measure; and also the Contents of a single Measure of each Sort, in English Cubic Inches.

		Number of each equal to 100 Eng. Gallons.	Contents of a single Measure of each Sort.
			Cub. Inchs.
Alicant	Cantaras	37.14	622
Altona	Tonnes	3.26	7072
	Stubgens	104.52	221
Amsterdam	Ankers	9.91	2331
	Stekans	19.82	1165
	Viertels	52.03	444
	Stoops	158.22	146
	Mingels	316.44	73
Augsburgh	Maafs	255.71	90
Ancona	Boccali	267.04	86
Antwerp	Stoops	119.08	194
Apulia	Salme	2.45	9428
Arragon	Cantaras	39.49	585
Barcelona	Wine Cargas	2.93	7877
	Arrobas	35.21	656
	Oil Cargas	3.12	7394
Bari	Oil Staji	22.87	1010
	Salme	2.29	10100
Bafil	Ohms	7.56	3053
Bayonne	Vcltes	51.22	451
Bergamo	Brente	5.20	4441
Berlin	Ankers	10.31	2239
Bern	Maafs	226.48	102
Blois	Quartauts	3.74	6183

Bologna

MEASURES.

			Number of each equal 100 Eng. Gallons.	Contents of a single Measure of each Sort.				Number of each equal 100 Eng. Gallons.	Contents of a single Measure of each Sort.
				Cub. Inch.					Cub. Inch.
Bologna	-	Corbe	5.13	4503	Hamburgli	-	Stubgen	104.52	221
	-	Boccali	308	75		-	Beer Tonnes	2.17	10608
Bourdeaux	-	Barriques	1.64	14033	Hanover	-	Ahms	2.43	9493
	-	Veltes	52.74	438		-	Stubgen	97.46	237
	-	Pots	181.18	127½		-	Beer Tonnes	3.73	6198
Bremen	-	Stubgens	118.79	194½	Heidelberg	-	Viertels	41.10	562
Breslaw	-	Eimers	6.82	3389		-	Maafs	164.40	140½
	-	Tops	135.88	170	Holstein	-	(See Hamburgli.)		
Brunswick	-	Stubgens	203.12	224	Hungary	-	Eimers	5.16	4474
Burgundy	-	Quartauts	3.68	6275		-	Tokay Anthals	7.49	3084
Cadiz	-	(See Spain.)			Konigberg	-	Stofs	264	87½
Canary Islands	-	Arrobas	24.34	949		-	Quarts	330	70
Candia	-	Oil Mistati	34.95	661	Leghorn	-	Wine Barrili	9	2564
Cassel	-	Quartlins	46.29	499		-	Fiafeli	180.47	128
Champaigne	-	Quartauts	4.20	5496		-	Boccali	360.94	64
Cognac	-	Veltes	51.68	447		-	Oil Barrili	11.89	1942
Cologne	-	Ohms	2.43	9501	Leipfic	-	Eimers	4.97	4644
	-	Viertels	63.29	365		-	Kannen	12.16	74
Constantinople	-	Almuds	72.41	319		-	Vifler Kannen	268.60	86
Copenhagen	-	Ahms	2.45	9420		-	Beer Tonnes	4.16	5550
	-	Ankers	9.81	2355	Lindau	-	Quarts	165	140
	-	Stubgens	98.07	235½	Lisbon	-	Almudes	22 21	1040
Cracow	-	(See Poland.)				-	Potes	44 12	520
Dantzic	-	Beer Stofs	164.40	140½		-	Canhadas	255.51	87
	-	Wine ditto	221.06	104½	Lisse	-	Lots	183.33	126
	-	Ahms	2.01	11495	London	-	(See England.)		
Dijon	-	Quartauts	3.68	6275	Lubec	-	(See Hamburgli.)		
Dresden	-	Vifler Kannes	268.60	86	Lucca	-	Oil Coppi	3.79	6093
	-	Common ditto	102.90	57½	Lyons	-	Pots	403.49	57½
	-	Wine Eimers	5.59	4128	Macon	-	(See Burgundy.)		
	-	Beer Tonnes	3.85	5993	Majorca	-	Oil Cortanes	91.66	252
Dunkirk	-	Pots	167.39	138	Malaga	-	(See Spain.)		
England	-	Beer Gallons	81.91	285	Malta	-	Caffili	18.19	1270
	-	Pints	655.28	32½	Mantua	-	Oil Moggi	3.39	6804
	-	Wine Gallons	100	231	Marfeilles	-	Millerolles	6.35	3639
	-	Pints	800	287½		-	Efcandeaux	25.40	910
Ferrara	-	Mastelli	4.60	5015		-	Pots	380.75	60½
	-	Secchie	36.84	627	Maffa	-	Oil Barrili	10.69	2161
Florence	-	Oil Barrili	11.87	1946	Mentz	-	Maafs	202.63	114
	-	Wine ditto	9.52	2427	Messina	-	Wine Salme	4.40	5242
	-	Fiafchi	190.90	121		-	Oil Caffifi	34.89	662
	-	Boccali	381.80	60½	Minorca	-	Barrillos	12	1927
France	-	Old Syftem, (See Paris.)				-	Quartillos	66	350
	-	New Syft. Litres	377.20	61½	Montpellier	-	Setiers	11.17	2067
	-	Decalitres	37.72	612½		-	Wine Barrals	14.89	1550
	-	Heclalitres	3.77	6124		-	Pots	358.14	64½
Francfort	-	Viertels	51.33	450		-	Oil Barrals	11.39	2028
	-	Maafs	205.33	112½		-	Pots	363.78	63½
Gallipoli	-	Salme	2.44	9459	Nantes	-	Veltes	67.34	343
Geneva	-	Setiers	8.37	2760	Naples	-	Wine Barrili	9.08	2544
	-	Quarterons	200.87	115		-	Oil Staji	20.39	1133
	-	Pots	401.74	57½	Narva	-	Ankers	9.77	2364
Genoa	-	Wine Barrili	5.10	4530		-	Stofs	292.40	79
	-	Pinte	255.24	90½	Nice	-	Rubbi	44	525
	-	Oil Barrili	5.85	3946	Nuremberg	-	Eimers	5.56	4149
Gotha	-	Stubgen	111.86	206½		-	Vifler Maafs	355.38	65
Hamburgli	-	Ahms	2.61	8836		-	Schenck Maafs	381.18	60½
	-	Ankers	10.45	2209	Oneglia	-	Oil Barrili	6.16	3749
	-	Eimers	13.07	1767	Oporto	-	Almudes	14.85	1555
	-	Viertels	52.26	442		-	Alquieres	29.73	777
						-	Canhadas	178.38	129½

Orleans

		Number of each equal 100 Gall. Gallons.	Contents of a single Measure of each Sort. Cub. Inch
Orleans	(See Burgundy.)		
Ofenaburg	Kannes	310.06	74
Oviedo	Cantaras	20.17	1145
Paris	Sotiers	50.43	458
	Pts	201.75	114
	Pintes	403.50	57
Pernau	(See Narva)		
Poland	Garnecs	238.14	97
Prague	Eimers	5.89	3916
	Pints	188.93	122
Ratibon	Great Eimers	3.33	6934
	Berg dato	4.31	5359
	Common ditto	4.58	5043
	Kopfen	293.33	78
Revel	Ankers	10.43	2214
	Stfs	312.16	74
Riga	Idem.		
Rochelle	Wine Barriques	2.17	10636
	Brandy Veltes	51.79	446
Rome	Wine Barrii	9.02	2560
	Oil ditto	10.31	2240
	Boccali	288.75	80
Rotterdam	(See Amsterdam.)		
Rouen	Pots	232.16	99
Russia	Weddras	30.72	752
	Krustas	245.75	94
Saragoffa	Cantaras	39.55	584
Scotland	Pints	223.18	103
Schaffhausen	Maafs	288.75	80
Sicily	Oil Caffisi	34.89	662
Spain	Wine Arrobas	23.60	981
	Azumbres	188.56	122
	Quartillos	757.37	30
	Oil Arrobas	29.97	771
Stettin	Ankers	7.34	3165
Stralfund	Stubgen	97.45	237
Strafburg	Ohms	8.21	2813
	Pots	197.43	117
Sweden	Eimers	4.82	4794
	Ankar	9.64	2397
	Kannor	144.37	160
	Stops	288.74	80
Toulon	Millerolles	5.93	3893
Triele	Orne	5.76	4007
	Boccali	207.48	111
Tripoli	Oil Mattari	16.80	1376
Tunis	Oil ditto	19.98	1157
	Wine ditto	39.96	578
Turin	Brente	6.71	3441
	Rubbi	40.31	573
Valencia	Arrobas	28.44	812
	Azumbres	113.79	293
Venice	Secchie	36.78	628
Verona	Brente	5.23	4417
	Baffe	83.68	276
Warsaw	(See Poland.)		
Vienna	Eimers	6.69	3452
	Maafs	267.57	86
Zell	Stubgen	97.45	237
Zurich	Land Maafs	206.25	112
	City dito	228.71	101
	Old ditto	273.91	84

Dr. Kelly, always actuated by a desire of promoting literature and science, has, with a polite attention, which we thus respectfully acknowledge, allowed us to extract several of the preceding tables from his very valuable work, the "Universal Cambill:" a work which is planned with judgment, and executed, at the expence of much time and labour, with accuracy, and which will be no less acceptable and useful to men of science in general, than to mercantile persons in particular.

MEASURES used by different artificers are 144 square inches = a square foot, 9 square feet = a square yard, 63 square feet = 7 square yards = a rood, 100 square feet = a square, and 272½ square feet = 30¼ square yards = a rod, perch, or square pole.

MEASURE of fire-wood. See *CORD of wood*.

MEASURE for Horses. See *HAND*.

MEASURE is also used to signify the cadence and time observed in poetry, dancing, and music, to render them regular and agreeable.

The different measures or metres, in poetry, are the different manners of ordering and combining the quantities, or the long and short syllables. Thus hexameter, pentameter, iambic, sapphic verses, &c. consist of different measures. In English verses, the measures are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleases. The most usual are, the heroic, generally consisting of five long, and five short syllables; and verses of four feet; and of three feet and a cæsura, or single syllable.

The ancients, by variously combining and transposing their quantities, made a vast variety of different measures. Of words, or rather feet, of two syllables, they formed a spondee, consisting of two long syllables; a pyrrhic, of two short syllables; a trochee, of a long and a short syllable; and an iambic, of a short and a long syllable.

Of their feet of three syllables, they formed a molossus, consisting of three long syllables; a tribrach, of three short syllables; a dactyl, of one long and two short syllables; and an anapæst, of two short and one long syllable. The Greek poets contrived a hundred and twenty-four different combinations or measures, under as many different names, from feet of two syllables to those of six. See *METRE* and *PROSODY*.

MEASURE, in *Music*, the interval, or space of time, which the person who beats time, takes between the raising and falling of his hand or foot, in order to conduct the movement, sometimes quicker, and sometimes slower, according to the kind of music, or the subject that is sung or played.

The measure is that which regulates the time we are to dwell on each note. See *TIME*.

The ordinary or common measure is one second, or sixtieth part of a minute, which is nearly the space between the beats of the pulse or heart; the systole or contraction of the heart answering to the elevation of the hand; and its diastole, or dilatation, to the letting it fall. The measure usually takes up the space that a pendulum, of two feet and a half long, employs in making a swing or vibration. The measure is regulated according to the different quality or value of the notes in the piece; by which the time, that each note is to take up, is expressed. The semi-breve, for instance, holds one rise, and one fall; and this is called the *measure*, or *whole measure*; sometimes the *measure-note*, or *time-note*; the minim, one rise, or one fall; and the crotchet, half a rise, or half a fall, there being four crotchets in a full measure.

MEASURES, *Musical*, are now much simplified, compared with those which our ancestors described, we cannot say used, as some of them are impracticable. In the musical MS. of Waltham holy-crofs, in the possession of the marquis of Lans-

downe, N^o 9, by Chilton, we have not only double and triple proportions, but quintuple, sesquialterate, and sesquioctavan; that is, when one minim in the base is as long as a semibreve, or two minims in the treble; as three minims; as five; as one and a half; as 16 to 12, or 12 to 9.

Whether all these measures were ever received in practical music, does not appear; but we can be very certain, if they were, that the result would be nothing but dislocation and confusion.

All measures and species of time in modern music are reduced to two proportions; the *binary, dual, or even measure*, in which the rise and fall of the hand are equal; and the *ternary, triple, or odd measure*, in which the fall is double to the rise. The first, usually called *common time*, is the measure consisting of two semibreves, two minims, or two crotchets; the second, or *triple time*, of three minims, three crotchets or three quavers.

To this purpose the number 3 is placed at the beginning of the lines, when the measure is intended to be triple; and a C, when the measure is to be common or double. This rising and falling of the hands was called by the Greeks *αγορη* and *τερη*. St. Augustine calls it *plausus*, and the Spaniards *compas*. See ARSIS and THESIS.

There is likewise a mixed or compound measure of 6 or 12 crotchets or quavers in a bar, indicated at the beginning of a movement, thus: $\frac{6}{4}$, or $\frac{12}{4}$, $\frac{9}{8}$, or $\frac{6}{8}$. But as all these measures move in triplets, for each portion of a bar, they are reducible to binary and ternary measures.

MEASURES, *Powder*, in *Artillery*, are made of copper, and contain from an ounce to twelve pounds: these are very convenient in a siege, when guns or mortars are loaded with loose powder, especially in ricochet firing, &c.

MEASURING, MENSURATION, defined *geometrically*, is the assuming any certain quantity, and expressing the proportion of other similar quantities to the same.

MEASURING, defined *popularly*, is the using of a certain known measure, and determining thereby the precise extent, quantity, or capacity of any thing.

Measuring, in the general, makes the practical part of geometry. See MENSURATION.

From the various subjects on which it is employed, it acquires various names, and constitutes various arts. Thus,

MEASURING of *Lines*, or quantities of one dimension, we call *longimetry*; and when those lines are not extended parallel to the horizon, *altimetry*. When the different altitudes of the two extremes of the lines are alone regarded, we call it *levelling*.

MEASURING of *Superficies*, or quantities of two dimensions, is variously denominated, according to its subjects: when conversant about lands, it is called *geodesia*, or *surveying*: in other cases, it is called simply *measuring*. The instruments used are the ten-foot rod, chain, compass, circumferentor, &c.

MEASURING of *Solids*, or quantities of three dimensions, we call *stereometry*; where it is conversant about the capacities of vessels, or the liquors they contain particularly, *gauging*.

The instruments for this art are the gauging-rod, sliding-rule, &c.

From the definition of measuring, where the measure is expressed to be similar or homogeneous to, *i. e.* of the same kind with, the thing measured, it is evident, that in the first case, or in quantities of one dimension, the measure must be a line; in the second, a superficies; and in the third, a solid. For a line, *v. gr.* cannot measure a surface; to measure, being no more than to apply the known quantity to the unknown, till the two become equal. Now a surface has breadth, and a line has none: and if one line have no breadth,

two or a hundred have none. A line, therefore, can never be applied so often to a surface, as to be equal to it, *i. e.* to measure it. And from the like reasoning it is evident, a superficies, which has no depth, cannot become equal to, *i. e.* cannot measure, a solid, which has.

While a line continues such, it may be measured by any part of itself: but when the line begins to flow, and to generate a new dimension, the measure must keep pace, and flow too; *i. e.* as the one commences superficies, the other must do so too. Thus we come to have *square* measures, and *cubic* measures.

Hence we see why the *measure of a circle* is an arc, or part of the circle; for a right line can only touch a circle in one point, but the periphery of a circle consists of infinite points. The right line, therefore, to measure the circle, must be applied infinite times, which is impossible. Again, the right line only touches the circle in a mathematical point; which has no parts or dimensions, and has consequently no magnitude; but a thing that has no magnitude or dimensions, bears no proportion to another, that has; and cannot therefore measure it. Hence we see the reason of the division of circles into 360 parts or arcs, called *degrees*. See ARC, CIRCLE, and DEGREE. See also MENSURATION.

MEASURING of *Triangles*, or from three given sides or angles to determine all the rest, is called *trigonometry*.

MEASURING of *the Air*, its pressure, spring, &c. is called *aerometry*, or *pneumatics*.

MEAT, CIBUS. See FOOD and DIET.

MEATS, *Dressing of*. See DRESSING.

MEATS, *Dry*. See XEROPHAGY.

MEATS, *White*. See WHITE.

MEATH, in *Geography*, a county of Ireland, which, though only the tenth in size, is one of the most distinguished on account of its many natural advantages. It is bounded on the north by the counties of Cavan, Monaghan, and Louth; on the east by the Irish channel and port of Dublin; on the south by the county of Kildare, and on the west by Westmeath. It extends from N. to S. 29 miles (36 English), and from E. to W. 35 (44½ English) miles, including an area of 512 square miles, or 327,900 acres Irish measure, which are equal to 822 square miles, or 526,700 acres English measure. This county, united with Longford, Westmeath, and part of some adjoining counties, was formerly one of the five kingdoms into which Ireland was divided; and long after the English obtained possession of the country, it was considered as a distinct province, though it is now part of Leinster. It derived its name, according to some, from a corruption of Media, from its being surrounded by the other kingdoms, but others derive its name from the Irish Magh or Maith, which signifies a plain or level country. On the establishment of the English in Ireland, Henry II. made a grant of Meath to Hugh de Lacy, who planted several colonies, and erected many castles, and was more powerful in Ireland, as he boasted, than Henry himself. In 1234 the inheritance of Meath passed, by marriage, to Jeffery de Geneville, from whom it, in like manner, passed to Mortimer, earl of March, whose daughter and heir married the duke of York, father of Edward IV. Meath formed a principal part of what was called the English Pale, and from the number of parishes into which it was divided, and the many ruins it contains, it is probable that it was then very populous. In 1792, the 147 parishes were, by unions, reduced to 59 benefices, of which 44 had churches, and 19 only glebe houses. The population was estimated by Dr. Beaufort at 112,400, the number of houses amounting to 22,468. Since the time that calculation was made (1792) a very great increase has probably taken place, but the writer knows of no *data* from which it can be estimated. The country

country is, in general, level, having few hills, and those of inconsiderable height. The soil is variable, but that most generally met with is a strong deep clay upon limestone gravel, at a greater or less distance from the surface, in different places. That land which borders on the county of Louth, north of the river Boyne, is the worst and most unprofitable, whilst the north-western and south-eastern districts are the most productive. Though some peculiar districts in other counties are richer, yet there is no tract of equal extent in Ireland of such excellent quality, and so appropriate to every purpose of grazing and tillage. Meath is indeed proverbial for cattle, and not only supplies the Dublin market, but also buyers from the north of Ireland, and from different parts of England. There is also a number of dairy farms, especially in the south-eastern part, which send their produce to the metropolis. Some butter is also made for exportation, but it is not highly prized. At Slaine there is a manufactory of cheese carried on by natives of England. The pastures yield a luxuriant crop of natural grasses, and there is little attention paid to the introduction of others. Some marshes on the Moynalty river feed an immense number of horses in the summer season; and the Kiltrew hills in the western angle adjoining Cavan, are remarkable for fattening sheep. Agriculture has of late years extended much, and about one-third of the county is at present under tillage. The crops commonly cultivated are, wheat, oats, barley, rye, clover, flax and potatoes. Cabbages, turnips, rape, and peas are also frequently met with, though not very general. The quantity of waste land, exclusive of bog, is very small, and chiefly consists of the commons belonging to some of the towns, which will probably be soon enclosed.

The manufactures of this county are few. The principal is that of facking, which is made from tow, brought out of the northern counties. This manufacture is chiefly carried on in the neighbourhood of Navan. Dowlas and three-quarters wide coarse linens are made in the parts near Drogheda, which are exported thence to the West Indies to clothe the negroes. In the north-western parts linen of a finer texture is made, which is sold in the county of Cavan. In the southern parts spinning is generally neglected, and there is no manufacture except of some coarse frieze for home consumption. It may be added that the manufacture of straw hats, both of split and whole straw, has been brought to great perfection, and is carried on to a great extent. In the western and northern parts of the county are some considerable bogs, which supply a large quantity of fuel, though not equal to the wants of the inhabitants; whilst the eastern parts have coal from Dublin or Drogheda. There are supposed indications of coal in several parts of the county, but no mine is worked. The other mineral productions are of little importance. There is a copper mine at Skreen, from which the proprietor has yet derived no benefit; and a valuable potters' clay near Dunshaughlin, reckoned equal, if not superior (says Mr. Thompson) to most of the potters' clay found in Staffordshire, which, though within fifteen miles of Dublin, has been turned to no account. Marble is found at some depth under the bogs, similar to that found in Louth, which is useful in agriculture; and the limestone at Ardracran has been thought ornamental in building.

Meath is well watered, and the attention paid to inland navigation cannot fail of contributing to its rapid improvement. The principal river is the Boyne, which rising in the county of Kildare, enters Meath in the south-western angle, and divides it into two nearly equal parts. Its course lies through some of the most fertile and best improved parts

of the county. Its banks in most parts rise to a considerable height, gradually sloping from the water's edge to their verdant brow, and in others bold projecting rocks and steep precipices overhang its limpid surface. Though in some places the river is much disturbed in its course by sharps and rocks, yet in others it flows silently along through flats of considerable extent, adding elegance and beauty to scenes scarcely to be equalled in Ireland. On this river, in its course within the county, are six extensive bolting mills, besides several grist and cloth mills, and one for the manufacture of cotton. A canal has been made, called the Boyne navigation, which is for the most part contiguous to the river. This canal has been completed as far as Navan, but the other projected cuts to Trim, Athboy, and Kells, remain unfinished, which appears, from Mr. Wakefield's account, to be the case with most of such undertakings in Ireland. The Blackwater, flowing from lough Ramor in the county of Cavan, enters the county in the north-west, and passing near the town of Kells, joins the Boyne at Navan. The Moynalty flows into the Blackwater, and the Athboy, Knightsbrook, and some other small rivers, add their waters to the Boyne. The river Nanny, or, as it is usually called, the *Nanny water*, rises near Navan, and takes nearly an easterly direction to the Irish sea. The water of this river has, like the Bann, the character of being peculiarly adapted to the purposes of bleaching. The sea-coast is principally a shelving strand with shallow water, so that little advantage is derived from it. The land adjoining is a light soil, resembling sea sand, without much vegetative power, and well adapted for rabbits. The towns in Meath are numerous, but generally small and ill built. Trim is the county town, but Navan is more thriving, from its easy communication with Drogheda. Tarah hill, on which there is now an insignificant village, is said to have been formerly the royal residence, not only of the kings of Meath, but also of the monarchs of Ireland. A Danish invader is supposed to have also taken up his abode there, and to have built the fine Danish fort or rath on the south-east side of the hill, which is now beautifully planted. Thompson's Statistical Survey of Meath. Wakefield's Account of Ireland.

MEATH, a bishopric in Ireland, the bishop of which takes precedence of all other Irish ones. Several small bishoprics gradually coalesced into one see, which received the name of Meath at the end of the 12th century, being the only one not taking its name from a city or town. In 1568 the bishopric of Clonmacnoife was incorporated with it by act of parliament. It extends from the sea to the Shannon, over part of six counties, and contains 663,600 Irish acres. The parishes are 224, but unless late improvements have been made, the churches are little more than a third part of the number. There is no cathedral in this diocese; neither is there a chapter, nor even a dean of Meath; the only dignities are the deanery of Clonmacnoife and the archdeaconry of Meath. The revenue of this see is stated by Mr. Wakefield to be 6000*l.* per annum. The episcopal residence is at Ardracran, near Navan. Dr. Beaufort's Memoir of a Map of Ireland.

MEATUS, in *Anatomy*, a term applied to two passages belonging to the ear. The meatus auditorius externus is the tube leading from the external ear to the membrana tympani. The meatus auditorius internus is the opening in the petrous portion of the temporal bone receiving the nerves of the seventh pair. See CRANIUM and EAR.

MEATUS Auditorius, Imperforate, in *Surgery*. Obstruction of the external tube of the ear is sometimes a congenital malformation. In particular cases, the outer opening

ing of the passage is closed by a membranous substance; in others, the canal is entirely obliterated, either by the approximation of its cartilaginous and bony parietes to each other, or by being filled up with a fleshy mass. In all these cases of simple closure, or complete obliteration, the deafness, that is unavoidably produced, is not equally easy of cure. When the opening of the meatus auditorius externus is merely shut up by membrane, this may have a crucial incision made into it, or it may be removed altogether by cutting in a circular manner. After either of these operations, the new opening must be kept from becoming again impervious, by the introduction of tents, until the part is entirely healed. When the membrane is more deeply situated, the operation is less easy of accomplishment. In this sort of case Richerand advises us to draw the external ear upwards, in order to efface the natural curvature of the meatus, and let the entrance of the light make the state of the inside of the passage visible. We are then to introduce a narrow straight bistoury, the blade of which is wrapped round with lint nearly to the point, and make an incision with great caution, taking particular care to avoid injuring the membrane of the tympanum. It was the apprehension of doing mischief to the latter part, that induced Lefchevin to prefer, in such examples, the application of caustic, to the employment of a cutting instrument. (Prix de l'Acad. de Chirurg. tom. i. p. 67. 118. 4to.) He advises us to apply the caustic to the bottom of the meatus auditorius several times, so as to destroy the preternatural membrane. It appears to us, however, that the use of caustic must here be exceedingly inconvenient, and hardly so safe as a bistoury. Perhaps caustic may be attended with the advantage of making an opening, that will be less likely to close again. Experience can alone determine such points.

When the bony and cartilaginous parietes of the meatus auditorius are in contact, the obliteration of the passage is incurable. But when the canal is filled up with a fleshy substance, the disease sometimes admits of relief. In such a case, M. Lefchevin recommends us to introduce a trocar, in the natural direction of the meatus auditorius, to the depth of from 15 to 18 lines. Should the point of the trocar now meet with no resistance, the instrument must be withdrawn, and a tent passed into the artificial opening, in order to keep it from becoming closed. When the trocar, after being introduced to such a depth, that there is reason to believe it has reached the natural situation of the cavity of the tympanum, and yet the same resistance to its further introduction is experienced, we are recommended to abandon the operation. Were any one, says M. Lefchevin, here to ascribe the want of success to unskilfulness in the surgeon, he would be very unjust.

A preternatural narrowness of the meatus auditorius externus is not so bad a case as its obliteration, and the deafness produced by it is incomplete. But it is not to be imagined, that a cure is practicable when the bony portion of this tube is the seat of the contraction. Should the cartilage alone be concerned, a gradual dilatation may be accomplished by means of prepared sponge, or tents made of lint, the size of which is to be increased every day. Richerand acquaints us, that he has preserved several temporal bones which belonged to subjects who were very hard of hearing; and in all of them the bony portion of the meatus auditorius is remarkably narrow. M. Lametrie has recorded an instance, in which this passage was so narrow in a young person, that it would scarcely admit of the introduction of a needle into it. Nosog. Chir. tom. ii. p. 124.—126. edit. ii.

There was a curious case (which was seen a few years ago by many medical gentlemen in London), of a total deficiency of the external ears, unattended with any meatus auditorius, the situation of this opening, on each side of the head, presenting only the common integuments. It was remarkable, that notwithstanding such malformation, the faculty of hearing was far from being altogether destroyed. In all probability, the internal and most essential parts of the ear were, in this example, altogether perfect; and it seems not unlikely, that, by removing a portion of the skin over the orifice of each meatus auditorius, the hearing might have been rendered still less dull.

Meatus Auditorius Externus, Extraneous Substances in.—Besides the defects of which we have been speaking, and which are, for the most part, congenital, the meatus auditorius may be obstructed by foreign bodies. With respect to water and other liquids, they readily escape on putting the head in a favourable position. Small solid substances, like a pea, bean, &c. are usually extracted with a pair of forceps, the blades of which should be of a slender construction. But if the foreign bodies cannot be thus extracted, surgical authors recommend us to try to break them to pieces with a stronger pair of forceps, in order to facilitate their removal. They also advise us to instil into the ear a few drops of the oil of almonds, both before and after the operation. The lodgment of extraneous substances in the ear may give rise to a train of most unaccountable and perplexing symptoms, as may be seen by referring to the fourth observation of Fabricius Hildanus, cent. 13.

Meatus Auditorius Externus, obstructed with Cerumen. See DEAFNESS.

Meatus Auditorius Externus, Polypi and other Tumours of.—These, when their situation will permit, must be removed with a knife, and the part to which they were attached may be touched with the argentum nitratum. When they cannot be cut away, they sometimes admit of extraction, or of being tied in the manner of other excrescences, situated in cavities. (See POLYPUS.) The application of caustic to them can scarcely ever be a prudent mode of treatment.

Meatus Auditorius Externus, containing Insects.—Worms which make their appearance in the meatus auditorius are always produced subsequently to ulcerations in the passage, or in the interior of the tympanum, and, very often, such insects are quite unsuspected causes of particular symptoms. In the cases of surgery, published in 1778 at Stockholm, by Olaus Acrel, there is an instance confirming the statement just offered. It is the case of a woman, who, having been long afflicted with a hardness of hearing, was suddenly seized with very violent convulsions, without any apparent cause, and soon afterwards complained of an acute pain in the ear. This affection was followed by a recurrence of convulsions, which were more vehement than before. A small tent of fine linen, moistened with a mixture of oil and laudanum, was introduced into the meatus auditorius, and on removing it the next day, several small round worms were observed upon it, and from that period all the symptoms disappeared. To this case we shall add another from Morgagni. A young woman consulted Valsalva, and told him, that when she was a girl a worm had been discharged from her left ear; that another one, about six months ago, had also been discharged, very much like a small silk-worm in shape. This event took place after some very acute pain in the same ear, the forehead, and temples. She added, that since this she had been tormented with the same pains at different intervals, and so severely, that she often swooned away for two hours together. On recovering from this

state, a small worm was discharged of the same shape as, but much smaller than, the preceding one, and that she was now afflicted with deafness and insensibility on the same side. After hearing this relation, Valsalva no longer entertained any doubt of the membrane of the tympanum being ulcerated. He proposed the employment of an injection, in order to destroy the nest of worms, which he presumed to exist. For this purpose distilled water of St. John's wort, in which mercury had been agitated, was used. Murgagni adds, that nothing appears to him more proper in such cases, to prevent a recurrence of such worms, than to avoid going to sleep, particularly in autumn and summer, without taking care to stop up the affected ear. If this be not done, flies, attracted by the suppuration, enter the meatus auditorius, and, while the patient is unconscious, deposit their eggs in the ear. Acrel, in speaking of worms generated in the meatus auditorius, observes, that there is no better remedy for them, than the decoction of ledum palustre, injected into the ear several times a day. However, as it is not always possible to procure this plant, we shall recommend in such cases, in preference to all other remedies, a slight infusion of tobacco in oil of almonds, a few drops of which are to be dropped into the ear, and to be retained there by means of a little bit of cotton. This application, which is not injurious to the lining of the passage, is fatal to insects, and especially to worms, as various experiments have convinced naturalists. This method may also succeed in cases, in which caterpillars, ants, and other insects, have insinuated themselves into the meatus auditorius; but it is always better, first to endeavour to extract them. A piece of lint, smeared with honey, often suffices for this purpose; and when they cannot be extracted by this simple means, they may be taken out with a very small pair of forceps, however little of them may be visible.

Meatus Auditorius Externus, Purulent Discharges from.

—The secreted matter may either proceed from suppuration of this passage itself, or from disease in the tympanum, the membrane of which is imperfect. The latter case may be the consequence of blows on the head, abscesses after fevers, the small-pox, or the venereal disease. In most instances, the little bones of the internal ear are detached, and escape externally, complete deafness generally ensuing. A total loss of hearing, however, does not invariably follow this kind of mischief, as we have ourselves witnessed in one or two examples. Greater hopes of such an event being avoidable may be indulged, when the disorder is confined to the meatus; as judicious treatment may now avert the most serious consequences. In Acrel's surgical cases, there is a case relative to the circumstance of which we are speaking. Suppuration took place in the meatus auditorius externus in consequence of acute rheumatism, which was followed by vertigo, restlessness, and a violent head-ache. The matter discharged was yellowish, of an aqueous consistence, and acid smell. The meatus auditorius was filled with a spongy flesh. On introducing the probe, our author felt a piece of loose rough bone, which he immediately took hold of with a pair of forceps, and extracted. From the time, when this was accomplished, the discharge diminished, and, with the aid of proper treatment, the patient became perfectly well.

Meatus Auditorius Externus, Inflammation of.—This passage, like every other part of the body, is subject to inflammation, which is frequently brought on by exposure to cold. It is hardly necessary to say, that topical bleeding and antiphlogistic means in general are indicated. The meatus auditorius should also be protected from the cold

air, particularly in the winter season, by means of a piece of cotton.

Mr. Saunders observes, "When the means employed to reduce the inflammation have not succeeded, and matter has formed, it is generally evacuated; as far as I have observed, between the auricle and mastoid process, or into the meatus. If it has been evacuated into the meatus, the opening is most commonly small, and the spongy granulations, squeezed through a small aperture, assume the appearance of a polypus. Sometimes the small aperture, by which the matter is evacuated, is in this manner even closed, and the patient suffers the inconvenience of frequent returns of pain from the retention of the discharge. When the parts have fallen into this state, it will be expedient to hasten the cure by making an incision into the sinus, between the auricle and mastoid process."

"It occasionally happens, that the bone itself dies, in consequence of the sinus being neglected, or the original extent of the suppuration. The exfoliating parts are the meatus externus of the os temporis or the external lamina of the mastoid process." See Saunders on the Anatomy of the Human Ear and its Diseases, p. 24, 25.

Meatus Auditorius, Herptic Disease of. See DEAFNESS.

Meatus Urinarius, Imperforate. See URETHRA, Imperforate.

MEAVAUA, in *Geography*, a town of Italy, in the county of Bormio; five miles N.E. of Bormio.

MEAUDEE, a town of the Birman empire, on the left bank of the Ava; 10 miles N. of Prome.

MEAUX, a town of France, principal place of a district, in the department of the Seine and Marne, before the revolution the see of a bishop, and distinguished by having been the first scene of the reformation in the time of Francis. The chief traffic consists in grain, wool, and cheese. The city contains 6447, and the canton 14,484 inhabitants, on a territory of 127 kilometres, in 15 communes. N. lat. 48° 58'. E. long. 2° 57'.

MEBOREA, in *Botany*, a word of whose origin no account is given, Aubl. Guian. 826. t. 323. (See RHORIVUM.) Jussieu places this genus amongst his *Planta incerte sedis*. We should have supposed it one of his *Euphorbia*, though it may not answer to all the characters he has given of that order.

MEBU, in *Geography*, a town of Japan, in the island of Nippon; 160 miles N.W. of Jedo.

MECATINA, an island in the gulf of St. Lawrence. N. lat. 50° 48'. W. long. 59° 10'.

MECCA, a city of Arabia, known to the Greeks under the name of "Macoraba," is situated in a dry and barren tract of country, a full day's journey from Jidda, which see. "Some latent motives perhaps of superstition," says Gibbon (Decl. Rom. Emp. vol. ix. p. 223.) "must have impelled the founders of this city to the choice of a most unpromising situation. Their habitations were erected of mud or stone, in a plain about two miles long and one broad, at the foot of three barren mountains; the soil being a rock; the water even of the holy well of Zemzem being bitter or brackish; the pastures remote from the city; and grapes transported to it above 70 miles from the gardens of Tayef. The fame and spirit of the Koreishites, who reigned in Mecca, were conspicuous among the Arabian tribes; but their ungrateful soil refused the labours of agriculture, and their position was favourable to the enterprizes of trade. By the sea-port of Gedda (or Jidda), at the distance only of 40 miles, they maintained an easy correspondence with Abyssinia; and the Christian kingdom afforded the first refuge to the disciples of Mahomet. The treasures

treasures of Africa were conveyed over the peninsula to Gerra or Katif, in the province of Bahrein, a city built, as it is said of rock salt, by the Chaldean exiles; and from thence, with the native pearls of the Persian gulf, they were floated in rafts to the mouth of the Euphrates. Mecca is placed almost at an equal distance, a month's journey, between Yemen on the right, and Syria on the left hand. The former was the winter, and the latter the summer station of her caravans: and their seasonable arrival relieved the ships of India from the tedious and troublesome navigation of the Red sea. In the markets of Saana and Merab, in the harbour of Oman and Aden, the camels of the Koreishites were laden with a precious cargo of aromatics; a supply of corn and manufactures was purchased in the fairs of Bosra and Damascus; the lucrative exchange diffused plenty and riches in the streets of Mecca; and the noblest of her sons united the love of arms with the profession of merchandize." On an approach to the high lands, a few leagues beyond it, abundance of excellent fruits is to be found. In the summer months, the heat is excessive at Mecca, and in order to avoid and moderate it as much as possible, the inhabitants take care to shut their windows and water the streets. Instances have occurred, of persons that have been suffocated in the streets by the burning wind, called "Samoum," or "Samiel." As many of the first nobility in Hedjas reside at Mecca, the buildings are better here than in any other city in Arabia. Among its elegant edifices the most remarkable is the Kaba or Caaba, or house of God, which was held in high veneration by the Arabians, even before the days of Mahomet. (See CAABA.) Niebuhr says, that no Christian dares to enter Mecca, on account of the prejudices of the people with respect to the sanctity of the place, who think that it would be profaned by the feet of infidel Christians; though there is no prohibition to this purpose in the laws of Mahomet. The superstitious people persuade themselves, that Christians are restrained from approaching it by a supernatural power. We may hence presume, that the Christians of Europe, who describe Mecca as eye-witnesses, have been renegadoes, who have escaped from Turkey. The Mahometans have such high ideas of the sanctity of Mecca, that they suppose it to extend even to the environs of the city. Its territory is reputed sacred, to a certain distance round it, which is indicated by marks set up for this purpose. Every caravan finds one of these marks in their way, which warns the pilgrims to put on the modest garb which it becomes them to wear on that sacred ground. The government of this holy city is seated in a Sherriff, who is a temporal prince; and his revenue is increased by the donations of Mahometan sovereigns. N. lat. $21^{\circ} 47'$. E. long. $56^{\circ} 46'$.

Every Mussulman, it is well known, is obliged, once in his life, to visit Mecca, and to perform acts of devotion in the sacred places. But if this duty were universally performed, the concourse of pilgrims would be immense, and the city would not contain the crowds that would resort to it from every country in which the Mahometan religion has been introduced. Those, whose circumstances do not admit of their undertaking this pilgrimage, are allowed to have a person to perform it for them. But a pilgrim of this description can act for no more than one person at the same time; and, in order to prevent imposture, he must bring back a formal attestation from an Imam at Mecca, testifying, that he has actually performed the appointed devotional exercises in the holy places, in the name of such a person, living or dead; for even after the death of any person, who, during life, has neglected this duty, it may be

discharged in his name, and for his benefit. The caravans that visit this city, are frequently composed of persons who become pilgrims more from motives of interest and traffic than from those of devotion. (See CARAVAN) A pilgrim who has not been present from the commencement at the celebration of all the ceremonies, and performed every act of devotion, cannot obtain the title of "Hadgi;" an honour much courted by the Turks, because it confers substantial privileges, and commands respect to those who bear it. (See MAHOMET and MAHOMETANISM.) We shall here observe, that a similar custom prevails among the Christians in the East, who are very anxious to obtain the title of "Hadgi" or "Mokdasi," which they give to pilgrims of their communion. In order to acquire this title, it is not sufficient for a person to go in pilgrimage to Jerusalem: he must spend the season of the passover in that city, and assist at all the ceremonies in the holy weeks. See PILGRIM.

MECCA, a town of Morocco, near the coast of the Atlantic. S. lat. $29^{\circ} 45'$. W. long. $9^{\circ} 45'$.

MECHADER, a town of Arabia, in Yemen; 27 miles S. of Sana. N. lat. $14^{\circ} 7'$. E. long. $44^{\circ} 15'$.

MECHAIN, PETER FRANCIS ANDREW, in *Biography*, a very able French mathematician and astronomer, was born at Laon in the year 1744. At an early age he discovered a strong inclination for mathematical pursuits, and while he was under the instruction of his tutors, corresponded with Lalande, whom he was desirous of assisting in his labours. In 1772, Mechain was invited to Paris, where he was employed at the depôt of the marine, and assisted M. Darquier in correcting his observations. Here his merit brought him acquainted with M. Doisy, director of the depôt, who gave him a more advantageous situation at Versailles. At this place he diligently observed the heavens, and, in 1774, sent to the Royal Academy of Sciences, "A Memoir relative to an Eclipse of Aldebaran," observed by him on the 15th of April. He calculated the orbit of the comet of 1774; and discovered that of 1781. In 1782, he gained the prize of the academy on the subject of the comet of 1661, the return of which was eagerly expected in 1790; and in the same year he was admitted a member of the academy, and soon selected for the superintendance of the Connoissance des Temps. In the year 1790, M. Mechain discovered his eighth comet, and communicated to the academy his observations on it, together with his calculations of its orbit. In 1792 he undertook, conjointly with M. Delambre, the labour of measuring the degrees of the meridian, for the purpose of more accurately determining the magnitude of the earth and the length of a metre. In the month of June 1792, M. Mechain set out to measure the triangles between Perpignan and Barcelona; and notwithstanding that the war occasioned a temporary suspension of his labours, he was enabled to resume and complete them during the following year. He died on the 20th of September 1805, at Castellon de la Plana, in the sixty-second year of his age. Lalande deploras his loss as that of not only one of the best French astronomers, but one of the most laborious, the most courageous, and the most robust. His last observations and calculations of the eclipse of the sun on the 11th of February, are inserted in the Connoissance des Temps for the year 15, and he also published a great many in the Ephemerides of M. Bode of Berlin, which he preferred to a former work after Lalande became its editor. A more extensive memoir of his labours may be seen in baron von Zach's Journal for July 1800; and Lalande's History of Astronomy for 1804.

MECHANICS, that branch of practical mathematics which

MECHANICS.

which considers motion and moving powers, their nature, laws, effects, &c. This term, in a popular sense, is applied equally to the doctrine of the equilibrium of powers, more properly called statics, and to that science which treats of the generation and communication of motion, which constitutes dynamics, or mechanics strictly so called. See **STATICS, POWER, MOTION, and DYNAMICS.**

This science is divided by Newton into practical and rational mechanics, the former of which relates to the mechanical powers, *viz.* the lever, balance, wheel and axis, pulley, wedge, screw, and inclined plane; and the latter, or rational mechanics, to the theory of motion; shewing, when the forces or powers are given, how to determine the motion that will result from them, and conversely when the circumstances of the motion are given, how to trace the forces or powers from which they arise.

Mechanics, according to the ancient sense of the word, considers only the energy of *organa*, or machines. The authors who have treated the subject of mechanics systematically have observed, that all machines derive their efficacy from a few simple forms and dispositions, that may be given to the *organa*, which are interposed between the agent and the resistance to be overcome; and to those simple forms they have given the name of mechanical powers, simple powers, or simple machines. See **MECHANICAL Powers.**

The practical uses of the several mechanical powers were undoubtedly known to the ancients, but they were almost wholly unacquainted with the theoretical principles of this science till a very late period; and it is therefore not a little surprising that the construction of machines, or the instruments of mechanics, should have been pursued with such industry, and carried by them to such perfection. Vitruvius, in his 10th book, enumerates several ingenious machines which had then been in use from time immemorial. We find, that for raising or transporting heavy bodies, they employed most of the means which are at present commonly used for that purpose, such as the crane, the inclined plane, the pulley, &c.: but with the theory or true principles of equilibrium they seem to have been unacquainted till the time of Archimedes. This celebrated mathematician, in his book of Equiponderants, considers a balance supported on a fulcrum, and having a weight in each scale; and taking as a fundamental principle, that when the two arms of the balance are equal, the two weights supposed to be in equilibrio are also of necessity equal, he shews, that if one of the arms be increased, the weight applied to it must be proportionally diminished. Hence he deduces the general conclusion, that two weights suspended to the arms of a balance of unequal length, and remaining in equilibrio, must be reciprocally proportional to the arms of the balance; and this is the first trace any where to be met with of any theoretical investigation of mechanical science. Archimedes also farther observed, that the two weights exert the same pressure on the fulcrum of the balance, as if they were directly applied to it; and he afterwards extended the same idea to two other weights suspended from other points of the balance, then to two others, and so on, and hence, step by step, advanced towards the general idea of the centre of gravity, a point which he proved to belong to every assemblage of small bodies, and consequently to every large body, which might be considered as formed of such an assemblage. This theory he applied to particular cases, and determined the situation of the centre of gravity in the parallelogram, triangle, trapezium, parabola, parabolic trapezium, &c. &c. To him we are also indebted for the theory of the inclined plane, the pulley, and the screw, besides the invention of a multitude of compound machines, of which, however, he

has left us no description, and therefore little more than their names remain.

We may judge of the very imperfect state in which the theory of mechanics was at that time, by the astonishment expressed by king Hiero, when Archimedes exclaimed, "Give me a place to stand on and I will move the earth," a proposition which could have excited no surprise in any person possessing a knowledge of the simple property of the lever. Of the theory of motion, however, it does not appear that even Archimedes possessed any adequate idea; the properties of uniform motion seem only to have engaged the attention of the ancients, and with those of accelerated and variable motion they were totally unacquainted: these were subjects to which their geometry could not be applied, the modern analysis being necessary to bring this branch of the science to perfection.

From the time of Archimedes till the commencement of the sixteenth century, the theory of mechanics appears to have remained in the same state in which it was left by this prince of Grecian science, little or no additions having been made to it during so many ages; but about this time, Stevinus, a Flemish mathematician, made known directly, without the introduction of the lever, the laws of equilibrium of a body placed on an inclined plane: he also investigated, with the same success, many other questions on statics, and determined the conditions of equilibrium between several forces concurring in a common point, which comes, in fact, to the famous proposition relating to the parallelogram of forces; but it does not appear, however, that he was at all aware of its consequences and application. In 1592, Galileo composed a treatise on Statics, which he reduced to this single principle, *viz.* it requires an equal power to raise two different bodies to heights having the inverse ratio of their weights; that is, whatever power will raise a body of two pounds to the height of one foot, will raise a body of one pound to the height of two feet. On this simple principle he investigated the theory of the inclined plane, the screw, and all the mechanical powers, and Descartes afterwards employed it in considering the statical equilibriums of machines in general, but without quoting Galileo, to whom he had been indebted for the first idea. To Galileo we are also indebted for the theory of accelerated motion, and its complete coincidence with the observed phenomena of nature may be considered as one of the greatest steps made at one time in the science of physics. Since all bodies, said this philosopher, are heavy, into whatever number of parts we divide any mass, it follows, that its total weight is proportional to the number of material atoms of which it is composed. Now the weight being thus a power always uniform in quantity, and its action never undergoing any interruption, it must, in consequence, be continually giving new impulses to a body, in every equal and successive instant of time, and while the body is falling, these impulses are incessantly accumulating, and remain in the body without alteration, the resistance of the air alone being deducted, and hence the motion must be accelerated by equal degrees.

Torricelli, a pupil of Galileo, prosecuted the subject after his master, and added several curious propositions concerning projectiles, to those which the latter had previously investigated. Huygens considered the motion of bodies along given curves, and demonstrated that the velocity of a heavy body, which descends along any curve, is the same at every instant in the direction of the tangent, as it would have acquired by falling freely from a height equal to the corresponding vertical absciss. Then applying this principle to the inverted cycloid, the axis of which is vertical, he found that

that a heavy body, from whatever part of the cycloidal arc it falls, always arrives at the lowest point of that arc in the same space of time. This very remarkable proposition includes what is commonly called the *isochronism* of the cycloid, and would alone have been sufficient to establish the fame of a geometrician. In 1661, Huygens, Wallis, and sir Christopher Wren, all discovered the true laws of percussion separately, and without any communication with each other, a proposition which Descartes had previously attempted, but failed in giving it a general solution. The finding of the centres of oscillation in compound bodies soon followed that relating to percussion, and here again Huygens equally distinguished himself by the accuracy and elegance of his solution; but as the principles which he employed were not well understood by the philosophers and mathematicians of that period, his investigations were much criticised at the time; but the honour of the discovery was finally attributed to him, and those of Descartes and Roberval admitted to be erroneous, or at least not sufficiently general. However, before the discovery of the fluxional calculus, there were many curious and interesting mechanical properties which the ancient geometry was incompetent to investigate, and which could never have been brought to light but by the assistance of this modern branch of analysis.

After the foundation of statics was laid by Archimedes, it was not difficult to discover the conditions of equilibrium in every particular case, and these had guided the genius of invention in a number of machines, but they were not yet reduced to a general and uniform principle.

Varignon undertook and accomplished this plan of combining them, by means of the theory of compound motions. He gave some sketches of this in 1687, in his Project of a new System of Mechanics, and he in some degree exhausted all the combinations of the equilibrium of machines, in his "General Mechanics," not published till after his death, in 1725. In 1695, la Hire published a "Treatise on Mechanics," the general object of which, like that of Varignon's, is the equilibrium of machines, beside which it contains various applications of machines to the arts, in which the author was well versed. He also subjoined a treatise on epicycloids, and their use in this science, particularly as relating to the forms of teeth in wheel-work. This is a beautiful theory, and is highly creditable to its author, who it appears from the testimony of Leibnitz was not la Hire, though he published it as such, but was due to the celebrated Danish mathematician Roemer, who had communicated it to Leibnitz twenty years before la Hire's work appeared. After this period, several elementary treatises on the subject of mechanics were published, without, however, adding much to the previous stock of knowledge, unless indeed we except that of Cornus, a work highly valuable for the strictness and perspicuity of its demonstrations.

At this time very little had been done with regard to the theory of variable motion; this now began to engage the attention of mathematicians, and opened an extensive field to their researches. Galileo, as we have seen, made known the properties of rectilinear and uniformly accelerated motions; Huygens had treated of curvilinear motion, which finally led to the beautiful theory of central forces in a circle, and which is equally applicable to motion in any curve, by considering them as infinite series of small arcs of a circle, agreeably to the idea which he himself had employed in his general theory of evolutes. The laws of the communication of motion, likewise sketched by Descartes, and farther pursued by Wallis, Huygens, and Wren, had made a new and very considerable step, by means of the solution which Huygens gave of the celebrated problem of the centres of oscillation.

All these acquisitions, at first separate and in some measure independent of each other, having been reduced to a small number of simple, commodious, and general formulæ, by means of the analysis of infinites, the science of mechanics acquired fresh vigour, and was prosecuted with the most unbounded success. The problems relating to motion were reduced into two classes; the first comprising the general problem of the motion of a single body acted upon by any given powers; and the second, the motions which result from the action and re-action that several bodies exert on each other in any given manner.

In the motion of a single body, we observe that matter, being of itself passive, if once set in motion, must uniformly persevere in it; and that its motion can neither increase nor diminish, unless by the action of some external power, which may be either constant or variable. And hence arise two principles, that of *vis inertiae* and that of compound motion; and on these are founded the whole theory of motion, rectilinear or curvilinear, constant or variable, according to a given law. By virtue of the *vis inertiae*, motion at every instant is essentially rectilinear and uniform, setting aside resistance and every obstacle that might otherwise impede or change its direction; and by the nature of compound motion, a body exposed to the action of a given number of forces, all tending at the same time to change the quantity and direction of its motion, takes such a path through space that in the last instant it reaches the same point at which it would have arrived, had it successively and freely obeyed each of the forces proposed.

On applying these principles to rectilinear motions uniformly accelerated, we perceive, 1st, that in this motion, the velocities increasing by equal degrees, or proportionally to the time, the accelerating force must be constant, or incessantly give equal impulses to the moving body, and that, consequently, the final velocity is as the product of the accelerating force multiplied by the time. 2dly. Each elementary portion of space passed through being as the product of the corresponding velocity multiplied by the element of the time, the whole of the space passed through is as the product of the accelerating force multiplied by the square of the time; and these two properties equally take place for each elementary portion of any variable motion whatever. Thus in every rectilinear motion variable according to a given law, the increment of the velocity is as the product of the accelerating force into the element of the time, and the second fluxion of the space passed through is as the product of the accelerating force into the square of the element of the time. Now if to these principles we add that of compound motion; we shall arrive at the knowledge of all curvilinear motion whatever. In fact, whatever forces be applied to a body describing a curve, we may at each instant reduce these forces to two, the one acting in the direction of the tangent at any point of the curve, and the other perpendicular to it; the first produces an instantaneous rectilinear motion, to which the principle of *vis inertiae* applies; and the second is expressed by the square of the actual velocity of the body, divided by the radius of curvature, agreeably to the theory of central forces in the circle, which equally reduces to the same principle the motion in the direction of the radius of curvature. Such were the general principles introduced into the science of mechanics by means of the modern analysis, and there seems to be no doubt that it was by pursuing this theory, Newton was led to those brilliant discoveries which he afterwards published in his "Principia" under a different form. In 1716, Hermann published his "De Phoronomia," in which he undertook to explain all that regards mechanics, both of
solids

solids and fluids, that is to say, statics, dynamics, hydrostatics, and hydraulics, in which he employs the synthetic method, although, like Newton, he doubtless derived most of his results from analysis, a circumstance which frequently interrupts the unity and connection of his problems.

The Mechanics of Euler, published in 1736, contain the whole theory of rectilinear and curvilinear motion in an isolated body, acted upon by any accelerating forces whatever, either in vacuo or in a resisting medium. The author has every where followed the analytical method, which, by reducing all the branches of this theory to uniformity, greatly facilitates the connection of it, and the whole is managed with an elegance and perspicuity, of which, before this time, we had no example. As to the principles of mechanics by which he puts his problems into equations, he employs those above mentioned.

This manner of laying the foundation of the calculation, however, though sufficiently commodious, was not the only one that might have been employed, nor was it the most simple. For the forces and motions at every instant may be resolved into other forces and motions parallel to fixed lines of given position in space. In which case nothing more is necessary than to apply the equations of the principles of *vis inertia* to these motions and forces, by which means the theorem of Huygens may be avoided. This simple idea, which was first employed by Maclaurin in his "Treatise on Fluxions," threw new light on the theory of mechanics, and much facilitated the solution of various problems. When the body moves constantly in one plane, two fixed axes only are to be taken, which are supposed to be perpendicular to each other, for the sake of greater simplicity; but when we are obliged, by the nature of the forces, to change the path continually in all directions, and to describe a curve of double curvature, three axes are to be employed perpendicular to each other, or forming the edges of a right-angled parallelepipedon. But the problems relating to the communication of motion, commonly called *dynamic problems*, required new principles. These, for instance, consist in determining the motions that result from the percussive of several bodies; the centre of oscillation of a compound pendulum; the motions of several bodies strung upon a rod, which has a rotatory movement round a fixed axis; &c.

Now it is evident, that in all cases of this kind the motion of the bodies is not the same as if the bodies were isolated and at liberty, but that there must be a distribution of the forces among all the bodies forming one whole, so that the motion gained by some of them is lost by others. The motion gained or lost is always estimated by the product of the mass into the velocity received or lost, whether the communication or the loss of motion be produced every instant by finite degrees, as in the shock of hard bodies, or whether the velocity change at each instant only by degrees infinitely small, as in motion of several bodies strung on a moveable rod, and generally in all cases where forces act in the manner of gravitation.

When Huygens gave his solution of the problems of oscillation, some unskillful mathematicians attacked it in reviews. James Bernouilli defended it in the Leipzig Transactions for 1686, and undertook to give a direct demonstration by means of the principle of the lever. At first, he considered only two equal weights fastened to an inflexible rod devoid of gravity, which was in motion round an horizontal axis. Having then observed that the velocity of the weights, nearest to the axis of rotation, must necessarily be less, and that on the other greater, than if each acted on the rod separately, he concludes that the force lost and the force

gained balance each other, and that, consequently, the product of the quantity of matter in one, into the velocity it loses, and that of the other multiplied by the velocity it gains, must be inversely proportional to the arms of the lever. This reasoning is in fact accurate, only James Bernouilli mistook in setting out, by considering the velocities of the two bodies as finite, instead of which he should only have considered the elementary velocities, and compared them with the similar velocities produced every instant by the action of gravitation. De l'Hôpital remarked this error, and in correcting it, he found the centre of oscillation of the two weights, without departing in other respects from the principle of Bernouilli. In order then to proceed to a third weight, he united the former two at their centre of oscillation, and combined this new weight with the third, as he had combined together the former two, and so on. But the proposed union was a little precarious, and could not be admitted without a demonstration. This led Bernouilli to revive his former solution, in order to extend it generally to any number of bodies, which he finally accomplished. His method consists in resolving the motion of each body at any given instant into two other motions, the one, that which the body actually takes; and the other, that which is destroyed, and in forming equations which express the condition of equilibrium between the motions lost; by which means the problem is brought under the general laws of statics. The author applies this principle to several examples, and demonstrates strictly, and in the most evident manner, the proposition which Huygens employed as the basis of his solution. See Memoirs of the Academy of Sciences for 1703.

This solution of the problem of the centres of oscillation, seemed to leave nothing to be desired; yet, in 1714, it was brought forward again by John Bernouilli and Dr. Taylor, which were fundamentally the same. This occasioned warm disputes between them, as to the originality of their performances. Here, instead of the elementary weights of which the pendulum is composed, other weights are supposed to be substituted, in one and the same point, such that their motion of angular acceleration, and their motion with respect to the axis of rotation, shall be the same, and the new pendulum oscillate as the former. But these solutions are not considered so luminous as that of James Bernouilli, which was founded immediately on the laws of equilibrium. Leibnitz estimated the momenta of bodies by the mass into the square of their velocities, and John Bernouilli having adopted the same opinion, gave to the principles of Huygens, for the problem of the centres of oscillation, the name of the principle of conversion of the *vires vivæ*, which it has retained, because, in fact, in the motion of a system of heavy bodies, the sum of the products of the masses into the squares of the velocities remains the same, when the bodies descend conjointly, and when they afterwards ascend separately, with the velocities they acquired by their descent. This principle was also followed with success in dynamical problems, by several able analysts of the last century; but as it gives only a single equation, from which the velocity or the time must afterwards be expunged, the second object was attained by different means.

John Bernouilli employed for this purpose the principle of *tensions*; Euler, that of *pressures*; Daniel Bernouilli, that of *virtual power*, which a system of bodies has of re-establishing itself in its former state; and in certain cases both he and Euler made use of the constant quantity of circulatory motion round a fixed point. And when at length all the differential, or fluxional equations of the problem

were established, it remained only to resolve them, which was of course the least difficult part of their investigations.

The principle which had been employed by James Bernoulli, in the solution of the problem relating to the centre of oscillation, was generalized by D'Alembert; he shewed, that in whatever manner the bodies of one system act upon each other, their motions may always be resolved at every instant into two sorts of motions, those of the one being destroyed in the successive instant, but the other retained; and that the motions retained are necessarily known from the conditions of the equilibrium between the motions destroyed. This general principle applies to all the problems of dynamics, and at least reduces all their difficulties to those of the problems of simple statics; and renders useless that of the conversion of *vires vivæ*. By this means D'Alembert has resolved a number of very beautiful and very difficult problems, some of which were absolutely new, as, for example, that relating to the precession of the equinoxes. These general principles were first developed by D'Alembert in 1743, but they were more fully treated of in his Treatise of Dynamics, published in 1749; a truly interesting and original work, highly creditable to the talents of this celebrated author. The science of dynamics having thus gradually attained a high degree of perfection, was still farther enriched, in 1765, by an important discovery, which is due to Segner; who has shewn in a short paper entitled "Specimen Theoriæ Turbinum," that if a body, of any size and figure, after rotatory or gyratory motions in all directions have been given to it, be left entirely to itself, it will always have three principal axes of rotation; that is, that all the rotatory motions, by which it is affected, may constantly be reduced to three, which are performed round three axes perpendicular to each other passing through the centre of gravity or inertia of the body, and always preserving the same position in absolute space, while the centre of gravity is at rest, or moves uniformly in a right line; the position of these three axes being determined by an equation of the third order. This theory, which its author had not sufficiently developed, Albert, the son of the celebrated Euler, treated at length in his paper "On the Stowage of Ships," which shared the prize of the Academy of Sciences at Paris for 1761, as did likewise his father, according to the same method, in the Memoirs of the Academy at Berlin for 1759, and in his work entitled "Theoria Motus Corporum rigidorum, 1765." Lastly, D'Alembert shewed in his "Mathematica Opuscula," vol. iv. published in 1768, that the solution of the problem was deducible from the formulæ which he had given in a memoir for determining the motion of a body of any figure, acted upon by any forces whatever, printed in vol. i. of his Opuscula in 1761. The knowledge of these motions of free rotation round three principal axes, naturally led to the determination of the motion round any variable axes whatever; and hence, if we consider the body to be acted upon by any given accelerating forces, we must begin with determining the rectilinear or curvilinear motion of the centre of gravity abstractedly from all rotatory motion, and then combining this progressive motion with the rotatory motion of a given point of the body round a variable axis, we shall know at every instant the compound motion of this point in absolute space. On these principles Euler has resolved many curious and interesting problems relating to dynamics, and the same have been since farther proved by subsequent mathematicians. (Bossut's Hist. Math.) We have thus given a sketch of the history and successive improvements of the science of mechanics, which is all that is necessary under the present

article, as the particular branches connected with this subject are treated of separately under their respective heads in the different articles of this work. But as we have only directed our attention to the more prominent parts of the history, the works to which our references have been made are very limited. It remains, therefore, before we conclude this article, to enumerate some of the principal writers on mechanics, or on particular branches of it, which are as follows, *viz.*

Newton, in his "Principia;" Guido Ubaldo, in his "Liber Mechanicorum;" Torricelli, "Libri de Motu Graviorum naturalitatis Decendentium et Projectorum;" Balianus, "Tractatus de Motu naturali Graviorum;" Huygens, "Horologium Oscillatorium," and "Tractatus de Motu Corporum ex Percussione;" Leibnitz, "Resistentia Solidorum," in Acta Euroditus, ann. 1684; Guldinus, "De Centro Gravitatis;" Wallis, "Tractatus de Mechanica;" Varignon, "Projet d'une Nouvelle Méchanique," and his papers in the Memoires Acad. ann. 1702; Borelli, "Tractatus de Vi Percussionis, de Motionibus naturalibus, &c.;" De Chales, "Treatise on Motion;" Pardies, "Discourse on Local Motion;" Parent, "Elements of Mechanics and Physics;" Casatus, "Mechanica;" Oughtred, "Mechanical Institution;" Robault, "Tractatus de Mechanica;" Lamy, "Méchanique;" Keil, "Introduction to true Philosophy;" De la Hire, "Méchanique;" Mariotte, "Tracti du Choe du Corps;" Ditton, "Laws of Motion;" Hermann, "Phoronomia;" Gravesande, "Physics;" Euler, "Tractatus de Motu;" Muschenbroeck, "Physics;" Bossu, "Méchaniques;" La Grange, "Méchanique Analytique;" Atwood, "On Motion;" Prony, "Architecture Hydraulique," and "Méchanique Analytique;" Francear, "Méchanique;" Gregory, "Mechanics in Theory and Practice," &c. &c. to which may be added the names of Nicholson, Enfield, Wood, Ferguson, Young, and Marat. For those works which relate principally to the description of machinery, see the article MACHINE.

MECHANICAL, something that relates to mechanics, or is regulated by the nature and laws of motion.

In which sense we say mechanical powers, mechanical properties or affections, mechanical principles, reasoning, knowledge, &c.

MECHANICAL Affections, are such properties in matter, as result from their figure, bulk, and motion.

MECHANICAL Causes, are those founded on such affections.

MECHANICAL Force. See FORCE.

MECHANICAL Solutions, are accounts of things on the same principles.

MECHANICAL Philosophy, is the same with what we otherwise call the *corpuseular philosophy*; *viz.* that which explains the phenomenon of nature, and the operations of corporeal things, on the principles of mechanics; *viz.* the motion, gravity, figure, arrangement, disposition, greatness, or smallness of the parts which compose natural bodies. See CORPUSCULAR.

MECHANICAL Powers, (so called,) are those machines which are used for raising greater weights, or overcoming greater resistances than could be effected by the natural strength without them; the power of strength being applied to one part of the machine, and another part of the machine applied to the weight or resistance.

There are two principal problems that ought to be resolved in treating of each of them.

The first is, to determine the proportion which the power and

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and weight ought to have to each other, that they may just sustain one another, or be in equilibrio.

The second is, to determine what ought to be the proportion of the power and weight to each other in a given machine, that it may produce the greatest effect possible, in a given time.

As to the first problem, this general rule holds in all powers; suppose the engine to move, and reduce the velocities of the power and weight to the respective directions in which they act; find the proportions of those velocities; then if the power be to the weight as the velocity of the weight is to the velocity of the power; or, which amounts to the same thing, if the power multiplied by its velocity, gives the same product as the weight multiplied by its velocity, this is the case wherein the power and weight sustain each other, and are in equilibrio; so that in this case the one would not prevail over the other, if the engine was at rest; and if it is in motion, it would continue to proceed uniformly, if it were not for the friction of its parts, and other resistances.

The second general problem in mechanics is, to determine the proportion which the power and weight ought to bear to each other, that when the power prevails, and the machine is in motion, the greatest effect possible may be produced by it in a given time. It is manifest, that this is an enquiry of the greatest importance, though few have treated of it. When the power is only a little greater than that which is sufficient to sustain the weight, the motion is too slow; and though a greater weight is raised in this case it is not sufficient to compensate the loss of time. When the weight is much less than that which the power is able to sustain, it is raised in less time; and this may happen not to be sufficient to compensate the loss arising from the smallness of the load. It ought, therefore, to be determined when the product of the weight, multiplied by its velocity, is the greatest possible; for this product measures the effect of the engine in a given time, which is always the greater in proportion as the weight which is raised is greater, and as the velocity with which it is raised is greater. For other considerations necessary to be regarded in the construction and use of machines, we refer to the articles MACHINE and MACHINERY.

The simple machines by which power is gained, are six in number, viz. the lever, the wheel and axle, or axis in peritrochio, the pulley (or rather system of pulleys), the inclined plane, the wedge, and the screw. Of these, all sorts of mechanical engines consist; and in treating of them, so as to settle their theory, we must consider them as mechanically exact, and moving without friction. Although these machines are treated of at large under their proper heads, it may not be amiss to give a short account of them all here.

1. A lever is an inflexible bar, turning upon a supporting prop as its centre of motion, which must be firm enough to bear the lever and the weight with which it is charged. There are three kinds of levers, and in each of them the velocity of each point is directly as its distance from the prop.

A lever is said to be of the first kind when the prop is between the weight and the power. Here the power and weight balance each other, when the power is in proportion to the weight as the distance of the weight from the prop is to the distance of the power from it; so that if a weight be twenty pounds, and at one foot from the prop, a power of one pound at twenty feet from the prop will balance the weight, supposing the lever itself to have no weight. To this sort of lever may be reduced all iron crows, scissars, pinchers, candle-snuffers, and the like.

A lever is said to be of the second kind, when the weight is between the prop and the power. Here the lever and weight balance each other when the power is in proportion to the weight as the distance of the weight from the prop is to the distance of the power from it. Of this sort are doors turning on hinges, oars, and such knives as are fixed at the point.

A lever is said to be of the third kind when the power is between the weight and the prop. In this, the power and weight balance each other, when the power is in proportion to the weight, as the distance of the weight from the prop is to the distance of the power from it: but this lever is never used where power is wanted to be gained; for in it, the intensity of the power applied, must always exceed the intensity of the weight to be raised, or resistance to be overcome. Of this sort are the bones of our legs and arms, and the wheels of clocks and watches. See LEVER and BALANCE.

2. In the wheel and axle, where the power is applied to the wheel, and the weight drawn up by a rope winding round the axle, the velocity of the power is to the velocity of the weight, as the circumference of the wheel is to the circumference of the axle, and the advantage gained by the machine is in the same proportion: for the power and weight balance each other when the power is in proportion to the weight, as the circumference of the axle is to the circumference of the wheel. This machine is the principal part of a common crane. See AXIS in Peritrochio.

3. A pulley, that only turns on its axis, and does not rise with the weight, serves only to change the direction of the power; for it gives no mechanical advantage thereto. But when, besides the upper pulleys, which turn round in a fixed frame, or block, there is a block of pulleys moving equally fall with the weight, the velocity of the weight is to the velocity of the power as one is to twice the number of pulleys in the moveable block: and the power and weight balance each other when the power is in proportion to the weight, as one is to twice the number of pulleys in the moveable block. See PULLEY.

4. An inclined plane is like one-half of a wedge which has been cut in two equal parts lengthwise. A weight raised, or a resistance moved, by an inclined plane, moves only through a space equal to the height of that machine, in the time that a power drives it through a space equal to its whole length. Therefore, the velocity of the power is in proportion to the velocity of the weight, as the length of the machine is to its thickness or height at the back; and the power and weight balance each other when the power is in proportion to the weight, as the thickness of the plane is to its length. All edge tools, which are chamfered (or ground down only on one side to the edge) are inclined planes, as far as the chamfer goes from the edge. See INCLINED PLANE.

5. A wedge, in the common form, is like two inclined planes, joined together at their bases; and the thickness of these planes (opposite their sharp edges) makes the back of the wedge, to which the power of the sledge or hammer is applied in cleaving of wood.

When two equal resistances act perpendicularly against opposite sides of the wedge, and a power acts perpendicularly against the back of the wedge, the velocity of the power is in proportion to the velocity of the resistance on either side, as the length of the side is to half the thickness of the back: and the power balances the resistance of the wood, when the power is in proportion to the resistance, as half the thickness of the back of the wedge is to the length of either of its sides, if the sharp edge goes to the bottom

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of the cleft in the wood. But when the wood splits before the wedge, as it generally does, the power balances the resistance, when the former is to the latter as half the thickness of the wedge (when it is driven quite into the wood) is to the whole length of the cleft below the back of the wedge. See WEDGE.

6. The *screw* may be considered as if it were an inclined plane, wrapt round a cylinder. In this machine, the power must turn the cylinder quite round, in the time that the weight or resistance (as in a common press) moves through a space equal to the distance between the threads or spirals of the screw. Therefore, the velocity of the power is in proportion to the velocity of the weight or resistance, as the circumference of a circle, described by the power, is to the distance between the spirals of the screw; and the power and resistance balance each other, when the former is to the latter as the distance between the spirals is to the circumference of the circle described by the power. This machine, besides the advantage peculiar to itself, has generally the benefit of the wheel and axle, on account of the winch or lever by which it is turned. See SCREW.

Of these six simple machines, all the most compound engines in the world are made. As the screw includes the inclined plane, and two equally inclined planes make the wedge, we have all the mechanical powers combined together in a common jack, if it be turned by the fly; for then we have also the lever, the wheel and axle, and the pulleys.

Thus, in a frame $ABCD$, (*Plate XXXII. Mechanics, fig. 5.*) fastened by the nut O upon the stand OO , and held together by the pillars VW and Bq , is adapted first the piece EF , whose fans or flies may be put in motion by the wind, or drawn by a hair fastened at F , which represents the lever and balance: at right angles to this piece is joined the perpendicular spindle GH , having upon it the endless screw H , which may be also considered as a wedge. This endless screw or worm takes the skew teeth of the wheel K , which is the axis in peritrochio, and, in turning round, winds up the string LM upon its axis, which passing round the pulleys at M and N , or drawing by a tackle of five, raises the weight P . But as the screw has no progressive motion on its axis, it cannot here be said to comprehend the inclined plane; therefore, in order to make this machine take in all the mechanical powers, we may add the inclined plane, $rqqR$, by making it rest on the ground at QR , and on the pillar qB , at qr , and thereby the force of the power drawing at F , will be farther increased in the proportion of QT to TS . The whole force gained by this machine is found by comparing the space gone through by the point F , with the height through which the weight is raised, in any determinate number of revolutions of F . An hundred pounds weight at P will be easily raised by the hair of a man's head drawing at F .

If an engine constructed in this manner be used for raising a weight, by means of a power applied to the fly, the power will balance the weight, if it be in proportion to the weight as the velocity of the weight is to the velocity of the fly. Now, considering how fast the fly moves with respect to the motion of the weight, it is evident, that a crane, constructed in the manner of a common jack, would be an engine of very great power. But then the time lost in raising the weight would also be very great: for, in any machine or engine whatever, the time lost in working it will be as great as the power gained by it.

If machines or engines could be made without friction, the least degree of power added to that which balances the weight would be sufficient to raise it. In the lever, the friction is next to nothing; in the wheel and axle it is but

small; in the pulleys it is very considerable; and in the inclined plane, wedge, and screw, it is very great. The universal law or principle in all mechanical machines or engines, made to gain power, is, that the power gained will be always as great as the velocity of the power exceeds the velocity of the weight or resistance: and, upon this principle, it is easy to compute the power, force, or advantage, of any simple machine or compound engine whatever.

E gr. If the body A (*Plate XXXII. Mechanics, fig. 6.*) be triple the body B , and each of them be so fixed to the extremities of a lever AB , whose fulcrum or fixed point is C , as that the distance of BC be triple the distance CA ; the lever cannot be inclined on either side, but the space BE , passed over by the less body, will be triple the space AD , passed over by the great one. So that their motions or moments will be equal, and the two bodies in equilibrio.

Hence that noble challenge of Archimedes, *datis viribus, datum pondus movere*; for as the distance CB may be increased infinitely, the power or moment of A may be increased infinitely. So that the whole of mechanics is reduced to the following problem.

Any body, as A, with its velocity C, and also any other body, as B, being given; to find the velocity necessary to make the moment or quantity of motion, in B, equal to the moment of A, the given body. Here, since the moment of any body is equal to the rectangle under the velocity, and the quantity of matter; as $B : A :: C : c$: to a fourth term, which will be c , the celerity proper to B , to make its moment equal to that of A . Wherefore in any machine or engine, if the velocity of the power be made to the velocity of the weight, reciprocally as the weight is to the power, such power will always sustain, or, if the power be a little increased, it will move the weight.

Let, for instance, AB be a lever, whose fulcrum is at C ; and let it be moved into the position aCb . Here, the velocity of any point in the lever is as the distance from the centre. For let the point A describe the arc Aa , and the point B the arc Bb ; then these arcs will be the spaces described by the two motions: but since the motions are both made in the same time, the spaces will be as the velocities. But it is plain, the arcs Aa and Bb will be to one another as the radii AC and CB , because the sectors ACa and BCb are similar: wherefore the velocities of the points A and B are as their distances from the centre C .

Now if any powers be applied to the ends of the lever A and B , in order to raise its arms up and down; their force will be expounded by the perpendiculars Sa and bN ; which, being as the right lines of the former arcs, aA and Bb , will be to one another also as the radii AC and CB ; wherefore the velocities of the powers are also as their distances from the centre. And since the moment of any body is as its weight, or gravitating force, and its velocity, conjunctly; if different powers of weights be applied to the lever, their moments will always be as the weights and the distances from the centre conjunctly. Wherefore, if to the same lever there be two powers or weights applied reciprocally proportional to their distances from the centre, their moments will be equal; and if they act contrarily, as in the case of a steel-yard, the lever will remain in an horizontal position, or the balance will be in equilibrio. And thus it is easy to conceive how the weight of one pound may be made to equilibrate a thousand, &c.

Hence also it is plain, that the force of the power is not at all increased by engines; only the velocity of the weight, in either lifting or drawing, is so diminished by the application of the instrument, as that the moment of the weight is not greater than the force of the power. Thus, for instance, if

if any force can raise a pound weight with a given velocity, it is impossible by any engine to effect, that the same power shall raise two pound weight with the same velocity: but by an engine it may be made to raise two pound weight, with half the velocity or 1000 times the weight with $\frac{1}{1000}$ of the former velocity.

We shall here introduce into our view, an account of the principal methods that have occurred to us of explaining and demonstrating the fundamental property of the several mechanical powers. It has been already observed, that, with regard to the lever, when any two forces act against each other on its arms, they will continue in equilibrio, if their quantities are inversely as the distance between the points to which they are applied, and the point or fulcrum round which the lever turns. The demonstration commonly ascribed to Archimedes is founded upon this principle, that when any cylindric or prismatic body is applied upon a lever, it has the same effect as if its whole weight was united and applied at the middle point of its axis. Let *AD*, *Plate XXXII. Mechanics, fig. 7.* be a cylinder, of an uniform texture, *C* its middle point; and it is manifest, that if the point *C* be supported, the equal halves of the cylinder, *CA* and *CB*, will balance each other about the point *C*, and the body will remain in equilibrio. Let the cylinder *AB* be distinguished into any unequal parts, *AD* and *DB*; bisect *AD* in *E*, and *DB* in *F*; then a power applied at *E*, equal to the weight of the part *AD*, with a contrary direction, will sustain it; and a power applied at *F*, equal to the weight of the part *DB*, with a contrary direction, will sustain that part; so that these two powers acting at *E* and *F*, respectively equal to the weights of *AD* and *DB*, have precisely the same effect as a prop at *C*, sustaining the whole cylinder *AB*, and may be considered as in equilibrio with a power, acting at *C*, equal to the whole weight of the cylinder. But the distance $CE = CA - AE = \frac{1}{2} AB - \frac{1}{2} AD = \frac{1}{2} DB$; and, in like manner, the distance $CF = CB - BF = \frac{1}{2} AB - \frac{1}{2} DB = \frac{1}{2} AD$; consequently *CE* is to *CF* as *DB* to *AD*; that is, as the power applied at *F* to the power applied at *E*, these being in equilibrio with the weight of the whole cylinder applied at *C*. From which it appears, that powers applied at *E* and *F*, which are to each other in the proportion of *CF* to *CE*, sustain one another about the centre *C*.

It has been objected by *M. Huygens* and others, to this demonstration of *Archimedes*, that when the whole cylinder is distinguished into two segments, part of the weight of the greater segments acts on the same side of the fulcrum with the lesser segment; and, therefore, when the whole weight of the greater segment is contracted into its middle point on one side of the fulcrum, and acts altogether against the lesser segment, it requires some proof to shew, that this contracted weight will be balanced by the weight of the lesser segment. *M. Huygens* proposed a method of his own, depending on a postulation assumed in common with *Archimedes*, and needing demonstration, *viz.* that when equal bodies are placed on the arms of a lever, the one which is farthest from the fulcrum will prevail and raise the other up.

Sir Isaac Newton demonstrates the fundamental proposition concerning the lever, from the resolution of motion: let *C*, *fig. 8.* be the centre of motion in the lever *KL*; let *A* and *B* be any two powers applied to it at *K* and *L*, acting in the directions *KA* and *LB*. From the centre of motion, *C*, let *CM* and *CN* be perpendicular to those directions in *M* and *N*; suppose *CM* to be less than *CN*, and from the centre *C*, at the distance *CN*, describe the circle *NHD*, meeting *KA* in *D*. Let the power *A* be represented by *DA*, and let it be resolved into the power *DG*

acting in the direction *CD*, and the power *DF* perpendicular to *CD*, by completing the parallelogram *AFDG*. The power *DG*, acting in the direction *CD* from the centre of the circle, or wheel, *DHN*, towards its circumference has no effect in turning it round the centre, from *D* toward *H*, and tends only to carry it off from that centre. It is the part *DF* only that endeavours to move the wheel from *D* towards *H* and *N*, and is totally employed in this effort. The power *B* may be conceived to be applied at *N* as well as at *L*, and to be wholly employed in endeavouring to turn the wheel the contrary way, from *N* towards *H* and *D*. If, therefore, the power *B* be equal to that part of *A* which is represented by *DF*, these efforts, being equal and opposite, must destroy each other's effect; that is, when the power *B* is to the power *A*, as *DF* to *DA*, or (because of the similarity of the triangles, *AFD*, *DMC*) as *CM* to *CD* or as *CM* to *CN*, then the powers must be in equilibrio; and those powers always sustain each other that are in the inverse proportion of the distances of their directions from the centre of motion; or when the product of the one power multiplied by the distance of its direction from the centre, is equal to the product of the power on the other side multiplied by the like distance from it.

Mr. Maclaurin proposes a new method of demonstrating the law of equilibrio in the lever, which seems, he says, to be founded on the plainest and most evident principles: these principles are the following, *viz.* that if equal powers act at equal distances on different sides of the fulcrum or centre of motion, with directions opposite and parallel to each other, they will have the same effect: and that, if gravity be supposed to act in parallel lines, and the fulcrum be between the bodies, whose powers are estimated, it must bear the sum of their weights; because the lever being loaded with those weights, it must give way, if the fulcrum does not sustain their sum: but if the powers are on the same side of the fulcrum, in which case one of them must pull upwards whilst the other pulls downwards, that there may be an equilibrio, it is then only loaded with the difference of the powers.

Supposing, therefore, first, two equal powers, *A* and *B*, *fig. 9.* acting in the directions *AF*, *BH*, to carry a body *C*, upon the lever *AB*, placed at *C* at equal distances from them; it is evident that, in this case, each of the powers *A* and *B* sustains one-half of the weight *C*, by dividing it equally between them. Imagine now that the power *A* is taken away, and that, instead of resting upon it, the end *A* of the lever rests upon a prop at *A*; it is manifest that the power *B* and the prop at *A* sustain, as before, each one-half of the weight *C*; the prop now acting, in every respect, as the power at *A* before; and, the equilibrium continuing, it appears that, in this case, a power *B* equal to one-half of the weight *C* sustains and balances it, when the distance of *C* from the prop *A* is one-half of the distance of *B* from the same; that is, when *B* is to *C*, as *CA* to *BA*, or $B \times BA = C \times CA$. From this simple instance we see, that powers act upon a lever not by their absolute force only, but that their effect necessarily depends upon the distance of the point where they act from the prop, or centre of motion; and particularly, that a power balances a double power which acts at half its distance from the prop, on the same side of it, with an opposite direction.

The case when the two powers act on the different sides of the prop, follows from this, by the principles already laid down. For let *BH* and *CG* (*fig. 10.*) represent the directions and forces with which the powers *B* and *C* act upon the lever; upon *BA* produced take *AE* equal to *AC*, or $\frac{1}{2} AB$, and in place of the power *CG* substitute

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an equal power $E K$ at E , with an opposite direction; and, by the first of those principles, this power $E K$ will have the same effect as $C G$, only the prop or centre of motion A will now sustain the sum of the forces $E K$ and $B H$, by the second of those principles. But the equilibrium between the powers $B H$ and $E K$ will continue as it was before, between $B H$ and $C G$; so that the powers $B H$ and $E K$ will be in equilibrio, when the power $B H$ is one-half of $E K$, and the distance of $E K$ from the prop A is one-half of the distance of $B H$ from the same; that is, when the power at B is to the power at E , as $A E$ to $A B$, or $B \times B A = E \times E A$. In this case, the prop A being loaded with both the powers B and E , which act with the same direction, its re-action must be equal to their sum, $E K + B H = 3 B H$, and must be in the opposite direction $A F$. In place of this re-action, let us now (*fig. 11.*) substitute a power $A F$ at A , equal to thrice $B H$; and in place of the power $E K$, let us substitute a prop at E , sustaining that end of the lever $B E$; and since the equilibrium continues as before, it follows that the prop or centre of motion, being at E , the power $B H$ sustains the power $A F$, which is triple of $B H$, when the distance of $B H$ from the prop E is triple of the distance of the power $A F$ from the same, that is, when $B H \times B E = A F \times A E$.

If we suppose the power $E K$ to remain (*fig. 12.*) but the end B of the lever $E B$ to rest upon a prop, then the powers $A F$ and $E K$ will sustain and balance each other, the prop at B now coming in place of the power $B H$; in which $A F = 3 B H$, and $E K = 2 B H$; so that $A F$ is to $E K$ as 3 to 2; and the distances $E B$ and $A B$ being in the same proportion, it appears that when two powers in the same proportion, it appears that when two powers in the proportion of three to two act upon a lever on the same side of the prop, or centre of motion, with opposite directions, at distances in the proportion of two to three, they then sustain each other. We have demonstrated therefore, that when the powers are in the proportion either of two to one, or of three to one, or of three to two, and the distances of their application from the centre of motion are in the inverse proportion, then those powers balance each other, or are in equilibrio.

Upon $B E$ produced (*fig. 13.*) take $E L = E A$; and in place of the power $A F$ substitute a power $L M = A F$, but with a contrary direction; this power $L M$ will have the same effect to turn the lever round the centre of motion E as $A F$ had; consequently it will be in equilibrio with the power $B H$, as $A F$ was. Therefore, when two powers $L M$ and $B H$, in the proportion of three to one, act upon a lever with the same direction, they are in equilibrio, if their distances from the centre of motion $L E$ and $E B$ be in the ratio of one to three: that is, when $L M \times L E = B H \times B E$. In this case, the powers $L M$ and $B H$ acting with the same direction, the prop E must sustain their sum $L M + B H = 4 B H$, by the second principle above premised. Therefore a power at L , as 3, and a power acting at B with the same direction, as 1, are sustained by a power acting at E , with a contrary direction, as 4. From which it follows, by substituting in the place of the power $L M$ a prop at L , that a power at B , as 1, sustains a power at E , as 4, acting with a contrary direction, when $B L$ is to $E L$ as 4 to 1; that is, when the powers are inversely as their distances from the prop, or centre of motion. By substituting the prop at B in the place of the power $B H$, it appears that a power $L M$ at L , as 3, sustains a power, acting with an opposite direction at E , as 4, when their distances $L B$ and $E B$, from the prop B , are to each other as 4 to 3, or when $L M \times L B = E K \times E B$. By taking upon $L B$ produced $B e = B E$ (*fig. 14.*), and in place of the

power at E , substituting an equal power at e with a contrary direction, it appears, that a power at L , as 3, sustains a power acting at e , with the same direction, as 4, when the distance $L B$ is to the distance $e B$, as 4 to 3. In this case, the prop at B sustains the sum of the powers acting at L and e , that is, a power equal to seven times $B H$. From which it follows, by substituting a prop at L or e , in place of the powers that act there, that a power at e , as 4, sustains a power at B , as 7, about the centre of motion L , when their distances from it, $e L$, $B L$, are to each other as 7 to 4: and that a power at L , as 3, sustains the power at B , as 7, about the centre of motion e , when their distances from it, $L e$ and $B e$, are to each other as 7 to 3.

By proceeding in this manner it appears, that when the powers are to each other as number to number, and when their distances from the centre of motion are in the inverse ratio of the same numbers, then the powers sustain each other, or are in equilibrio. From which it is easy to shew, in general, that when the powers are to each other in any ratio, though incommensurable, and the distances of their application from the centre of motion in the same inverse ratio, then they are in equilibrio; because the ratio of incommensurable quantities may be always limited to any degree of exactness at pleasure, between a greater and a lesser ratio of number to number. To Mr. Maclaurin's demonstration it has been objected, that it cannot be applied when the arms of the lever are incommensurable, and as it cannot conclude generally, it must, therefore, be imperfect.

Dr. Hamilton, having observed that these several methods of demonstrating the fundamental property of the lever are liable to objections, proposes a new proof, depending on the following postulatum, *viz.* if a force be uniformly diffused over a right line, so that an equal part of the force acts upon every point of the line, and if the whole force acts according to one and the same plane, this force will be sustained, and the line kept in equilibrio; by a single force applied to the middle point of the line equal to the diffused force, and acting in a contrary direction. He also premises this lemma: if a right line be divided into two segments, the distances between the middle of the whole line and the middle points of the segments, will be inversely as the segments. This is self-evident when the segments are equal; and, when they are unequal, since half of the whole line is equal to half of the greater and half of the lesser segment, it is plain that the distance between the middle of the whole line and the middle of one segment, must be equal to half of the other segment, so that these distances must be to each other inversely as the segments.

Let the line $G H$, then, *fig. 15*, whose middle point is D , be divided into the unequal segments $G L$ and $L H$, whose middle points are C and F , and let two forces or weights, A and B , which are to each other as the segments $G D$ and $L H$, be applied to their middle points C and F , and let them act perpendicularly on the line $G H$: then, (by the lemma) the weights A and B will be to each other inversely as $C D$ and $F D$ (the distances of the points C and F , to which they are applied, from the middle of the whole line); if then a third force or weight E , equal to the sum of the forces A and B , be applied to the point D , and acts on the line in an opposite direction; I say these three forces will sustain each other, and keep the line in equilibrio. For let us suppose the force E to be removed, and instead of it another force, equal also to the sum of A and B , to be uniformly diffused over the whole line $G H$, and to act directly against the forces A and B , then the part of this force which acts on the segment $G L$, will be equal to the force A , and therefore will be sustained by it (postulatum);

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latum); and the other part, which is diffused over the segment LH , will be equal to and sustained by the force B , so that the forces A and B will sustain this diffused force and keep the line in equilibrio. Let now two other forces act also on this line in opposite directions, one of them the force E acting on the point D , as it was first supposed to do, and the other an uniformly diffused force equal to E (and consequently equal to the other diffused force), then these two additional forces will also balance each other, and therefore the equilibrium will still remain. So that the two forces A and B , and a diffused force acting on one side of the line sustains the force E , and a diffused force acting on the other side: but it is manifest, that in this equilibrium, the two diffused forces acting on opposite sides are perfectly equivalent, and therefore if they are taken away from both sides, the equilibrium must still remain. Hence it appears that the three weights or forces A , B , and E , any two of which are, (by the construction) to each other inversely as their distances from the third, will sustain each other and keep the line on which they act in equilibrio; which is the first and most simple case of the property of the lever; for here the directions of the weights are supposed to be perpendicular to the line on which they act, and it is evident that, if one of the points C , D , or F be fixed or considered as a fulcrum, the weights acting on the other two points will continue to support each other. The second case of the property of the lever is easily deduced from the first; for when two weights act on the arms of a lever in oblique directions, and are to each other inversely as the perpendicular distances of the lines of direction from the centre of motion, then by the resolution of forces, it is easily proved that the parts of those forces which act perpendicularly on the arms of the lever, and which only are exerted to turn the lever, are to each other inversely as the lengths of those arms; and therefore by the first case they must balance each other.

From what has been above demonstrated, it appears, that the powers with which any two forces move or endeavour to move the arms of a lever, are as the rectangles, under lines proportional to the forces, and the perpendicular distances of their lines of direction from the fulcrum; and also that when two bodies acting on the arms of a lever sustain each other, if one of them be removed farther from the fulcrum, it will preponderate; but if it be brought nearer to the fulcrum, the other weight will prevail: because the product to which its force is proportional will be increased in the first case, and diminished in the second.

When a weight is to be raised by means of an axle and wheel, it is fastened to a chord that goes round the axle, and the power, which is to raise it, is hung to a chord that goes round the wheel. If then the power be to the weight as the radius of the axle to the radius of the wheel, it will just support that weight; as will easily appear from what was proved of the lever. For the axle and wheel may be considered as a lever, whose fulcrum is a line passing through the centre of the wheel and middle of the axle, and whose long and short arms are the radii of the wheel and axle which are parallel to the horizon, and from whose extremities the chords hang perpendicularly. And thus an axle and wheel may be looked upon as a kind of perpetual lever, on whose arms the power and weight always act perpendicularly, though the lever turns round its fulcrum. And in like manner, when wheels and axles move each other by means of teeth on their peripheries, such a machine is really a perpetual compound lever; and, by considering it as such, we may compute the proportion of any power to the weight it is able to sustain by the help of such an engine. And since the radii of two contiguous wheels, whose teeth are applied to each other, are as

the number of teeth in each, or inversely as the number of revolutions, which they make in the same time: we may, in the computation, instead of the ratio of these radii, put the ratio of the number of teeth on each wheel; or the inverse ratio of the number of revolutions they make in the same time.

The most natural method of explaining the effects of the pulley, that is, of computing the proportion of any power to the weight it can sustain by means of any system of pulleys, is, by considering that every moveable pulley hangs by two ropes equally stretched, which must bear equal parts of the weight: and, therefore, when one and the same rope goes round several fixed and moveable pulleys, since all its parts on each side of the pulleys are equally stretched, the whole weight must be divided equally amongst all the ropes by which the moveable pulleys hang. And consequently if the power which acts on one rope be equal to the weight divided by the number of ropes, or double the number of moveable pulleys, that power must sustain the weight.

The several cases in which the wedge is applied may be comprehended in one general proposition: let the equicrural triangle ABC (*fig. 16.*) represent a wedge, the lines AB and CB will be the sides of the wedge, AC its base, or back, and its height will be the line PB bisecting the base AC , and also the vertical angle ABC .

When any two resisting forces act on the sides of a wedge, in directions which make equal angles with the sides, (as they are always supposed to do,) a power acting perpendicularly at P on the base of the wedge will keep the resisting forces in equilibrio, when it is to the sum of these forces, as the sine of half the vertical angle of the wedge, to the sine of the angle which the directions of the forces contain with the sides of the wedge.

For let E and F be two bodies acting on the sides of the wedge, and let them be first supposed to act in the directions EP and FP perpendicular to the sides; then since the power P acts perpendicularly on the base AC , if these three forces keep the wedge in equilibrio, they will be to each other, as the sides of a triangle to which their directions are parallel, or (which is the same thing) as the sides of the triangle ABC , to which their directions are perpendicular. Therefore, the power P is to the sum of the resisting forces which it sustains as AC , the base of the wedge, to the sum of the sides, or as PA , half the base, to AB , one of the sides; but PA is to AB as the sine of PBA , half the vertical angle of the wedge, to the radius which is the sine of a right angle, and the directions of the resisting forces are supposed in this case to contain a right angle with the sides of the wedge.

Let now the resisting bodies E and F be supposed to act on the wedge in directions parallel to the lines DP and OP , which make oblique angles with its sides, draw EG and FK perpendicular to those lines. From what has been proved, it appears that the power P is to the force with which it is able, by means of the wedge, to protrude the resisting bodies in the directions PE and PF , as the sine of half the vertical angle to the radius; let this protruding force be expressed by the line PE , and let it be resolved into two forces expressed by the lines PG and GE , the former of these only will act in opposition to the resisting bodies, therefore the whole protruding force of the power is to the force with which it acts against the resisting bodies E and F in the directions PD and PO as PE to PG , or (because the triangles EPG and DPE are similar) as PD to PE , that is, as the radius to the sine of the angle PDE ; compounding, therefore, the ratio of the sine of half the vertical angle to the radius, with the ratio of the radius to the sine of the angle PDE ,

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the power P, when the wedge is kept in equilibrio, will be to the force with which it protrudes the resisting bodies in directions opposite to those in which they act, as the sine of half the vertical angle to the sine of the angle PDE or POF, which the directions of the resisting forces contain with the sides of the wedge.

Hence, when the directions in which resisting bodies act on a wedge are given, we may easily find two lines that will express the proportion between the resistance and the power which sustains it by means of the wedge. For from P, the middle point of the wedge, draw the line PD meeting one of the sides, and parallel to the direction in which the resisting force acts on that side, then the power will be to the resistance as PD to PB the height of the wedge. For PD and PB are to each other as the sines of the opposite angles, in the triangle PBD, that is, as the sines of half the vertical angle, and the angle which the direction of the resisting force contains with the side of the wedge.

From what has been demonstrated we may deduce the proportion of the power to the resistance it is able to sustain, in all the cases in which the wedge is applied.

First, when, in cleaving timber, the wedge fills the cleft, then the resistance of the timber acts perpendicularly on the sides of the wedge; therefore, in this case, when the power which drives the wedge is to the cohesive force of the timber as half the base to one side of the wedge, the power and resistance will be in equilibrio.

Secondly, when the wedge does not exactly fill the cleft, which generally happens because the wood splits to some distance before the wedge: let E L F represent a cleft, into which the wedge ABC is partly driven; as the resisting force of the timber must act on the wedge in directions perpendicular to the sides of the cleft, draw the line PD in a direction perpendicular to EL, the side of the cleft, and meeting the side of the wedge in D; then the power driving the wedge, and the resistance of the timber, when they balance, will be to each other as the line PD to PB, the height of the wedge.

Thirdly, when a wedge is employed to separate two bodies that lie together on a horizontal plane, for instance two blocks of stone; as these bodies must recede from each other in horizontal directions, their resistance must act on the wedge in lines parallel to its base CA; therefore, the power which drives the wedge will balance the resistance, when they are to each other as PA, half the breadth of the wedge, to PB its height; and then any additional force, sufficient to overcome the resistance arising from the friction of the bodies on the horizontal plane, will separate them from each other.

With respect to the inclined plane: let the line AB, (*fig. 17.*) represent the length of an inclined plane, AD its height, and the line BD, we may call its base. Let the circular body GEF be supposed to rest on the inclined plane, and to be kept from falling down it by a string CS tied to its centre C. Then the force with which this body stretches the string will be to its whole weight as the sine of ABD, the angle of elevation, to the sine of the angle which the string contains with a line perpendicular to AB, the length of the plane. For let the radius CE be drawn perpendicular to the horizon, and CF perpendicular to AB, and from E draw EO parallel to the string, and meeting CF in O: then, as the body continues at rest, and is urged by three forces, to wit, by its weight in the direction CE, by the re-action of the plane in the direction FC, and by the re-action of the string in the direction EO; the re-action of the string, or the force by which it is stretched, is to the weight of the body as EO to CE; that is, as the sine of

(the angle ECO, which is equal to) ABD, the angle of elevation, to the sine of the angle EOC, equal to SCO, the angle which the string contains, with the line CF perpendicular to AB, the length of the plane.

When, therefore, the string is parallel to the length of the plane, the force with which it is stretched, or with which the body tends down the inclined plane, is to its whole weight, as the sine of the angle of elevation to the radius, or as the height of the plane to the length. And in the same manner it may be shewn, that when the string is parallel to BD, the base of the plain, the force with which it is stretched is to the weight of the body as AD to BD, that is, as the height of the plane to its base. If we suppose the string, which supports the body GEF, to be fastened at S, and that a force by acting on the line AD, the height of the plane, in a direction parallel to the base BD, drives the inclined plane under the body, and by that means makes it rise to a direction parallel to AD: then, from what was proved in the third case of the wedge, it will appear, that this force must be to the weight of the body as AD to BD, or rather in a proportion somewhat greater; if it makes the plane move on and the body rise.

From this last observation we may clearly shew the nature and force of the screw; a machine of great efficacy in raising weights, or in pressing bodies closely together. For if the triangle ABD be turned round a cylinder whose periphery is equal to BD, then the length of the inclined plane BA will rise round the cylinder in a spiral manner, and form what is called the thread of the screw, and we may suppose it continued in the same manner round the cylinder, from one end to the other; and AD, the height of the inclined plane, will be every where the distance between two contiguous threads of this screw, which is called a convex screw. And a concave screw may be formed to fit this exactly, if an inclined plane every way like the former be turned round the inside of a hollow cylinder, whose periphery is somewhat larger than that of the other. Let us now suppose the concave screw to be fixed, and the convex one to be fitted into it, and a weight to be laid on the top of the convex screw: then, if a power be applied to the periphery of this convex screw to turn it round, at every revolution the weight will be raised up through a space equal to the distance between the two contiguous threads, that is, to the line AD, the height of the inclined plane BA; therefore, since this power applied to the periphery acts in a direction parallel to BD, it must be to the weight it raises as AD to BD, or as the distance between two contiguous threads, to the periphery of the convex screw.

The distance between two contiguous threads is to be measured by a line parallel to the axle; if we now suppose that a handspike or handle is inserted into the bottom of the convex screw, and that the power which turns the screw is applied to the extremity of this handle, which is generally the case; then as the power is removed farther from the axis of motion, its force will be so much increased, and therefore so much may the power itself be diminished. So that the power which, acting on the end of a handle, sustains a weight by means of a screw, will be to that weight, as the distance between two contiguous threads of the screw, to the periphery described by the end of the handle. In this case we may consider the machine as composed of a screw and a lever, or, as Sir Isaac Newton expresseth it, *Cuneus a veste impulsus*.

Professor Vince, premising that Dr. Hamilton's demonstration depends upon this proposition, that when a body is at rest, and acted upon by three forces, they will be as the three sides of a triangle parallel to the directions of the

forces, allows this principle to be true, when the three forces act at any point of a body; but, considering the lever as the body, the three forces act at different points, and therefore the principle, as applied by the author, is certainly not applicable. If in this demonstration we suppose a plane body, in which the three forces act, instead of simply a lever, then the three forces being actually directed to the same point of the body, the body would be at rest. But in reasoning from this to the case of the lever, the same difficulties would arise, as in the proof of sir I. Newton. But admitting that all other objections could be removed, the demonstration fails when any two of the forces are parallel. Another demonstration is founded upon this principle, that if two non-elastic bodies meet with equal quantities of motion, they will, after impact, continue at rest; and hence it is concluded, that if a lever which is in equilibrio be put in motion, the motions of the two bodies must be equal; and therefore the pressures of these bodies upon the lever at rest, to put it in motion, must be as their motions. Now in the first place, this is comparing the effects of pressure and motion, the relation of the measures of which, or whether they admit of any relation, we are totally unacquainted with. Moreover, they act under very different circumstances; for in the former case, the bodies acted immediately on each other, and in the latter, they act by means of a lever, the properties of which we are supposed to be ignorant of. When forces act on a body, considered as a point, or directly against the same point of any body, we only estimate the effect of these forces to move the body out of its place, and no rotatory motion is either generated, or any causes to produce it, considered in the investigation. When we, therefore, apply the same proposition to investigate the effect of forces to generate a rotatory motion, we manifestly apply it to a case which is not contained in it, nor to which there is a single principle in the proposition applicable. The demonstration given by Mr. Landen, in his Memoirs, is founded upon self-evident principles, nor does our author see any objections to his reasoning upon them. But as his investigation consists of several cases, and is besides very long and tedious, something more simple is still much to be wished for, proper to be introduced in an elementary treatise of mechanics, so as not to perplex the young student either by the length of the demonstration, or want of evidence in its principles. What the ingenious Professor proposes to offer will, he hopes, render the whole business not only very simple, but also perfectly satisfactory.

The demonstration given by Archimedes would be very satisfactory and elegant, provided the principle on which it is founded could be clearly proved; viz. that two equal powers at the extremities, or their sum at the middle of a lever, would have equal effects to move it about any point. Now, that the effects will be the same, so far as respects any progressive motion being communicated to the lever when at liberty to move freely, is sufficiently clear; but there is no evidence whatever that the effects will be the same to give the lever a rotatory motion about any point, because a very different motion is then produced, and we are supposed to know nothing about the efficacy of a force at different distances from the fulcrum to produce such a motion. Besides, the two motions are not only different, but the same forces are known to produce different effects in the two cases; for in the former case the two equal powers at the extremities of the arms produce equal effects in generating a progressive motion; but in the latter case they do not produce equal effects in generating a rotatory motion. We cannot therefore reason from one to the other. The principle, however, may be thus proved.

Let A, C, (fig. 18.) be two equal bodies placed on a straight lever, AP, moveable about P; bisect AC in B, produce PA to Q, and take BQ = BP, and suppose the end Q

to be sustained by a prop. Then as A and C are similarly situated in respect to each end of the lever, that is, AP = CQ, and AQ = CP, the prop and fulcrum must bear equal parts of the whole weight; and therefore the prop at Q will be pressed with a weight equal to A. Now take away the weights A and C, and put a weight at B equal to their sum; and then the weight at B being equally distant from Q and P, the prop and fulcrum must sustain equal parts of the whole weight, and therefore the prop will now also sustain a weight equal to A. Hence if the prop Q be taken away, the moving force to turn the lever about P in both cases must evidently be the same; therefore the effects of A and C upon the lever to turn it about any point are the same as when they are both placed in the middle point between them. And the same is manifestly true if A and C be placed without the fulcrum and prop. If, therefore, AC be a cylindrical lever of uniform density, its effect to turn itself about any point will be the same as if the whole were collected into the middle point B; which follows from what has been already proved, by conceiving the whole cylinder to be divided into an infinite number of laminæ perpendicular to its axis, of equal thicknesses.

The principle, therefore, assumed by Archimedes is thus established upon the most self-evident principle, that is, that equal bodies at equal distances must produce equal effects; which is manifest from this consideration, that when all the circumstances in the cause are equal, the effects must be equal. Thus the whole demonstration of Archimedes is rendered perfectly complete, and at the same time it is very short and simple. The other part of the demonstration we shall here insert, for the use of those who may not be acquainted with it.

Let XY (fig. 19.) be a cylinder, which bisect in A, on which point it would manifestly rest. Take any point Z, and bisect ZX in B, and ZY in C; then, from what has been proved, the effects of the two parts ZX, ZY to turn the lever about A is the same as if the weight of each part were collected into B and C respectively, which weights are manifestly as ZX, ZY, and which therefore conceive to be placed at B and C. Now AB = AX - XB = $\frac{1}{2}$ XY - $\frac{1}{2}$ XZ = $\frac{1}{2}$ YZ; and AC = AY - YC = $\frac{1}{2}$ XY - $\frac{1}{2}$ ZY = $\frac{1}{2}$ XZ; consequently AB : AC :: $\frac{1}{2}$ YZ : $\frac{1}{2}$ XZ :: YZ : XZ :: the weight at B : the weight at C.

The property of the straight lever being thus established, every thing relative to the bent lever immediately follows. See Maclaurin's Account of sir Isaac Newton's Phil. Disc. book ii. chap. 3. Hamilton's Phil. Ess. ess. 1. or Phil. Transf. liii. p. 116. Phil. Transf. vol. lxxxiv. art. v. p. 33; &c.

MECHANICAL is also applied to a kind of reasoning, which of late has got great ground, both in physics and medicine; thus denominated, as being conformable to what is used in the contrivance, and accounting for the properties and operations of machines. See MEDICINE.

MECHANICAL is also used, in Mathematics, to signify a construction or proof of some problem, not done in an accurate and geometrical manner, but coarsely and unartfully, or by the assistance of instruments; as are most problems relating to the duplicature of the cube, and the quadrature of the circle.

MECHANICAL Arts. See ARTS.

MECHANICAL Curve. See TRANSCENDENTAL CURVE.

MECHANICAL Pathology, the system of medicine adopted by Borelli, Pitcairn, and others, at the end of the seventeenth and beginning of the eighteenth centuries, by which they endeavoured to explain the phenomena of disease upon the principles of mechanical philosophy; principles which were very partially applicable to the operations of animal

life; the system, therefore, was exploded by the more philosophical researches into the laws of the sensorial power, or nervous energy, peculiar to living beings, by the pathologists of succeeding times. See *MEDICINE, History of*, near the end.

MECHELEN, in *Geography*, a town of France, in the department of the Lower Meuse, and chief place of a canton, in the district of Maestricht. The place contains 906, and the canton 7736 inhabitants, on a territory of 390 kilometres, in 17 communes.

MECHLIN. See *MALINES*.

MECHOACAN, a province or large district, in the domain of Mexico, bounded on the N. by part of Guatetea, or Panuco, and the provinces of Zacatecas and Guadalajara, on the E. by another part of Guatetea, and Mexico proper, and on the S. by the latter and the South sea, which, together with Xalisco or New Galicia, bounds it also on the W. and N.W. It extends about 210 miles along the coast, and still further inland. The air is singularly healthy, and the soil very fertile. In this province are mines of silver, and, as it has been said, some of gold and copper. Among its productions we may reckon maize and cotton, the cacao or chocolate nut, the root mechoacan, several odoriferous gums, and balsam, sarsaparilla, ambergris, vanillas, cassia, honey, wax, &c. The natives, since they have been incorporated with the Spaniards, have acquired the knowledge of several trades, and are curious in the manufacture of cabinets, weaving silk, and earthen pottery; and they particularly excel in making images of small feathers, equal to the most exquisite painting. The country is infested with foxes, squirrels, lions, wild dogs, and tygers; but it has also a numerous breed of excellent horses for the saddle or harness. The sea, as well as its lakes and rivers, supply abundance of excellent fish. In this province there are two considerable lakes one of which gave name to the lake, implying "fishery," as it used anciently to supply the capital. This lake is situated on the N. of Pasquaro, the capital of the province, while Valladolid, or Mechoacan, has only the bishopric. According to Alcedo, it is about 12 leagues in circumference, probably about 40 English miles, perhaps equalling that of Tezeuco, though represented in our maps as of far inferior size. The fish is exquisite; and many Indians dwell in picturesque islets, occupied in fishing, or bringing to the capital in canoes fish, fruits, flowers, and pot-herbs. Mechoacan was formerly a kingdom, but the Spaniards have reduced it into a bishopric, in which are about 200 towns of converted natives. As in this province there are scarcely any harbours that deserve the name of ports, the greatest part of the trade is carried on by land.

MECHOACAN, or *Valladolid*, a city of Mexico, in the province of Mechoacan, and a bishop's see, situated on a river near the W. side of a lake, which abounds with fish. It is large and well decorated; 108 miles W. of Mexico. N. lat. 20° 5'. W. long. 102° 11'.

MECHOACAN, *Mechoacanna*, called also *white jalap*, *white rhubarb*, and *American scammony*, a medicinal root, taking its name from a province of Mexico, from whence it is brought in thin transverse slices, like jalap, but larger and whiter. (See *JALAP*.) Mechoacan scarcely yields one-sixth part so much resin as jalap does. It is a species of bindweed. See *CONVOLVULUS*.

Mechoacan was first introduced about the year 1524, and used as a purgative before jalap, though the latter is now in more general use, as being found more efficacious: yet mechoacan is the milder and more gentle of the two, and on that account is preferable. The seat of its action is chiefly in the extreme parts; for which reason it is accounted

good in arthritic pains. It has the advantage of needing no preparation, or corrective; and of purging in its own proper substance, as it grows.

It purges serous humours from all parts of the body; and helps the dropsy, jaundice, the rheumatism, working with gentleness, and without griping; and, therefore, it is fit for weakly tender constitutions; but by reason that a larger quantity must be given than most people are willing to take, it is grown very much out of use. The dose in substance is from one drachm to two or more.

M. Boulduc found, by analysing it, that it contains twelve times as much salt as resin; but neither the saline nor resinous extract purge so freely as the substance, even though taken in larger doses; nor do they even purge so easily.

In the choice of mechoacan, prefer those pieces which are the brownest within, and whose substance is the closest, and most compact.

MECKENHEIM, in *Geography*, a town of France, in the department of the Rhine and Moselle, seated on the Erft; 7 miles S.S.W. of Bonn. N. lat. 50° 40'. E. long. 6° 57'.

MECKLENBURG, a town of the duchy of the same name, anciently the capital of the Obotrites, and called by some old historians, probably on account of its extent, "Megapolis." Formerly it contained three convents, and in 1058 a bishopric was founded. Since the founding of Wismar, it has sunk into a village; 2 miles S. of Wismar.

MECKLENBURG, *Duchy of*, might formerly be said to consist of three parts, *viz.* Schwerin, Güstrow, and Strelitz. But now only those of Schwerin and Strelitz are preserved, and the duchy of Mecklenburg Güstrow has fallen to the house of Schwerin, and, becoming incorporated with it, has lost its distinctive name. Wismar, which was formerly ceded to the Swedes, was afterwards purchased of the king of Sweden, and now belongs to this branch of the house of Mecklenburg. This principality is bounded on the N. by the Baltic, on the E. by Pomerania, on the S. by Brandenburg, and on the W. by the territory of Lubeck and principality of Luneburg. When the Vandals, in a considerable number, quitted this country in the fifth century, the Wends occupied their habitations, and became intermixed with the inhabitants that remained. Of these Wends, the most considerable tribe was that of the Obotrites, which had its own particular princes. From these descended Prebislau, who, in the 12th century, embraced the Christian religion, and rebuilt Mecklenburg, the ancient capital of the Obotrite princes, and took his name from it. His son, Henry Borwin, was father of two princes, one of whom, *viz.* John, was the founder of the Mecklenburg line, and the other, *viz.* Nikolot, that of Wenden: but when this latter became extinct, the principality of Wenden devolved to the Mecklenburg branch, which was raised to the dignity of duke by the emperor Charles IV. At the peace of Westphalia, in 1648, Wismar was ceded to the Swedes; but the dioceses of Schwerin and Ratzeburg were converted into temporal principalities. The Güstrow line failed, and, after some disputes, a compromise took place at Hamburg in 1701, on condition that the principality of Güstrow should be added to that of Schwerin, and that the principality of Ratzeburg, with some other territories, should be annexed to that of Strelitz. At the same time, the right of primogeniture, and the lineal succession, were established in both houses, and the compact was ratified by the emperor Leopold. Two lines of the dukes of Mecklenburg are still subsisting. The Schwerin line commenced in duke Frederic William; and the Strelitz line commenced in duke Adolphus Frederic II. The annual revenues of the Schwerin line are considerable; and they were formerly rated

rated at 300,000 six-dollars *per annum*. The duke of the Mecklenburg Strelitz line is said to receive about 126,000 six-dollars. The two duchies are divided into three circles, *wiz.* Mecklenburg, Wenden, and Stargard.

The accounts of the soil and produce of this country are various and contradictory, even among the Mecklenburgers themselves. According to the remonstrance of the nobility in 1718 to the imperial court against the contribution exacted from them, the country was represented as full of lakes, which were almost wholly unproductive, and as abounding with heaths, moors, woods, fens, and quarries. The soil was said to be sandy, and capable of producing only a small quantity of rye and oats, and the pastures and meadows afforded but poor food for their sheep. The arable lands, even when well manured, produce for the most part only barley, and very little wheat. The account given by Clavier and Frank, who have described the country, is very different. About $\frac{1}{3}$ th of the country, they say, is sandy, but the worst of the sandy land produces excellent rye, and, when suffered to lie fallow, affords good sheep-walks; but the country in general is represented as incomparable, and not exceeded by Pomerania or Holstein. When well tilled and dunged, it yields barley and wheat, generally five, six, or eight-fold. The country is interspersed with delightful eminences, pleasant and profitable woods; nor is it destitute of good fruit trees. Several forests have been afforted, fens drained, and, together with the moors and quarries, improved into arable and pasture land. The commons and meadows, not inferior to those of Holstein and Pomerania, afford grass in such plenty, that the country exports annually some thousands of cattle: the lakes and rivers, by their abundance of fish, yield large revenues.

The principal rivers are the Elbe, Stor, Reckenitz, and Havel. In both duchies, exclusive of Rostock, are 45 great and small cities. The inhabitants of both duchies are Lutherans. In the country also there are some congregations of Calvinists; and in Schwerin the Roman Catholics are permitted the free exercise of their worship. The towns have German schools, and Rostock has an university. The country is not destitute of woollen manufactures, tanners, leather-dressers, tobacco-spinners, and other trades. The exports of the country are corn, flax, hemp, hops, wax, honey, cattle, butter, cheese, wool, and several kinds of wood.

MECKLENBURG, a county of Virginia, bounded S. by the state of North Carolina; containing 8332 free inhabitants, and 8676 slaves.—Also, a county of North Carolina, in the district of Salisbury, bounded S. by the state of South Carolina; containing 10,317 inhabitants, of whom 1931 are slaves. Its chief town is Charlotte.

MECKLEY, a country of Thibet, occupying the space between Bengal and China, is bounded on the E. by China; on the S. by Ava, or the Birman empire; and on the W. by thick forests, which separate it from Bengal; it is about 350 miles in length, and 170 in breadth, subject to the king of the Birman empire. N. lat. $22^{\circ} 30'$ to $27^{\circ} 20'$. E. long. $93^{\circ} 20'$ to $98^{\circ} 40'$. See **ARRACAN**.

MECKMUHL, a town of Wurtemberg, on the Jaxt; 32 miles N.N.E. of Stuttgart. N. lat. $49^{\circ} 20'$. E. long. $9^{\circ} 23'$.

MECOBANISH, a lake of Canada. N. lat. $48^{\circ} 58'$. W. long. $83^{\circ} 45'$.

MECON, or **MENAN**, a large river of Asia, which rises in the mountains of Thibet, between the 34th and 35th degrees of N. latitude, and pursuing a southerly course bearing eastward, it passes through the Chinese province of Yun-nan, the kingdom of Laos, Cambodia, &c., and runs

into the Eastern sea, about 200 miles S. of the city of Cambodia. At first this river is called "Kion-long," and retains this name till it enters Laos, when it takes the name of Mecon; when it enters Cambodia, it receives the name of the country, till at the city of Cambodia, it separates into two branches, the eastern of which is called Cambodia, or the Japanese river, and the western Oubequeme.

MECONIUM, *Meconium*, from *popus*, poppy, in *Pharmacy*, is the juice of the heads or capsules of poppy, or papaver somniferum drawn by incision, and dried.

Opium differs from the meconium, which, by the ancients, was made of the expressed juice or decoction of the poppies, and it was deemed by them much more inactive in its operation than the opium. See **OPIMUM**.

The college of London directs an extract of white poppy to be prepared by decoction of the poppy capsules in water, and subsequent inspissation. For this purpose, take a pound of white poppy capsules bruised, and a gallon of boiling water. Macerate for 24 hours; then boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence. This differs from opium, which is believed to be the concrete milky juice which exudes on making incisions into the fresh capsules, though probably some additions are made to it. Six grains of this extract are about equivalent to one of opium; but much of the comparative narcotic power of the plant itself may depend upon the influence of climate. The seeds are first to be separated from the capsules, for they produce no narcotic effect; they yield oil and mucilage, and readily rub into an emulsion.

A decoction of poppy, decoctum pro fomento, P. L. 1787, fofus communis, P. L. 1745, is thus prepared: take of white poppy capsules bruised four ounces, and of water four pints; boil for a quarter of an hour and strain. For various purposes, especially fomentation, advantage is derived from the solution of the narcotic matter contained in poppy heads; this may, therefore, be considered as an useful addition, and as reducing into form a decoction in very common use.

MECONIUM is also a black thick excrement, gathered in the intestines of a child during the time of gestation.

In colour and consistence it resembles pulp of cassia. It is also thought to resemble meconium, or juice of poppy; whence it takes its name. See **INFANT**.

MECRAN, or **MERKAN**, in *Geography*, a large province of Persia, extending to the Indian deserts, is bounded on the N. by Segeltan and Candahar; on the E. by Hindoostan; on the S. by the Indian sea; and on the W. by Kerman. This is the ancient Gadruftan, or Gedrosia. A chain of mountains crosses it, and divides it into two almost equal parts. This province has been always unfertile, and full of deserts; and classical geography, says Pinkerton, here presents only one mean town, called Pura, probably Borjian, on the most W. frontier. The extensive sea-coast on the Indian ocean, far from being the seat of commerce, scarcely presents one harbour, being almost an uniform line of sterility, inhabited by Arabs, like most of the southern coasts of Persia, which are divided by mountains and deserts from the fertile and cultivated land. Travellers in their journies are often stopped, and sometimes overwhelmed by deep and moving sands. In this province water is scarce, and it has few rivers. The capital is Kidge.

MECRINHOS, a town of Portugal, in the province of Tras los Montes; 24 miles S.E. of Mirandela.

MECZARA, a town of Africa, in the kingdom of Tambut.

MEDA, a town of Portugal, in the province of Beira; 20 miles N.E. of Pinhel.

MEDACO, a town of Africa, in the country of Meetka. N. lat. $14^{\circ} 30'$. E. long. $23^{\circ} 20'$.

MEDAL, MEDALIA, a small figure, or piece of metal, in form of a coin, destined to preserve to posterity the portrait of some great man, or the memory of some illustrious action.

Scaliger derives the word from the Arabic *methalia*, a coin whereon is impressed the figure of a human head. Menage and Vossius rather derive it from *metallum*. Du Cange observes, that the obolus was anciently called *medalia quasi medietas nummi*; as being half of another coin.

Medals may be distinguished by the metal of which they are made; which is commonly one of the three metals, *aurum*, *argentum*, and *æs*, signified by the three A's, which, on several coins, are placed after the name of the mint-master, viz. gold, silver, and copper, or brass.

The most usual purity of coined gold amounts to about 22 carats, two carats being deducted from the standard of the utmost purity, which is fixed at 24 carats, and consisting of alloy. See COIN.

The most ancient gold coins existing, those of Lydia and other states in Asia Minor, are not of the purest gold. Many of the earliest coins seem to be formed of the metal anciently called "electrum;" and consisting of gold and silver. But when Philip of Macedon coined the first gold of Greece, procured from the mines of Philippi in Thrace, the art of refining gold had attained great perfection, for his coins are of the utmost purity. They are rivalled, however, by those of his son Alexander, and of other princes and cities within a few centuries of that age. The gold coins of the Egyptian Ptolemies are 23 carats three grains fine, with only one grain alloy. The Roman gold coinage is very pure from the earliest times, and remained in this state till the reign of Severus. Pliny says, that most gold was found mixed with silver; of which the latter amounted to one-fifth. The metal was called "electrum." The most ancient silver is, like the gold, less pure than that of succeeding time, and this was particularly the case with that of the Greeks. The Roman silver was rather inferior to the present standard, even from the beginning; but in the time of Severus very bad silver appeared, and continued till that of Diocletian. The brass of the ancients, when pure, which is rather uncommon, consisted of two kinds; the red, or what the ancients called Cyprian brass, which we call copper, and the yellow, or brass. As medals of these metals are generally covered with patina, the difference has not excited attention; though in Roman coins brass was double the value of copper; and the Greeks, it is supposed, followed the same rule.

The ancients had also numerous coins made of mixed metals. The first mixture was that of gold and silver, and called "*Electrum*;" which see. The next metal of value was Corinthian brass, which was employed in the fabrication of vases and other ornamental toys; but it does not appear, according to Mr. Pinkerton, that they ever struck a single medal in this metal. The real fact is, that the coins, which some medallic authors have called Corinthian brass, are only struck as a modification of common brass. The zinc which is mingled with the copper in the furnace for the manufacture of brass, gives it a great variety of hues in proportion to the quality of the zinc, or of the copper. The best and finest of these hues belongs to what is now termed "Prince's metal," which seems to have been that which the first medallists called Corinthian brass. Of Egyptian coins, struck under the Roman emperors, some were at first of tolerable silver; but by degrees they degenerated into a metal, called by the French Medallic writers

"Potin," being a mixture of copper and tin, with a little silver. These coins are remarkably thick; but many of them are elegantly executed, in a peculiar style, with uncommon reverses. There are, likewise, brass coins of Egypt, of three sizes, from the earliest Roman emperors there, and of a different fabrication. Some coins of that which is called large brass, are of the mixtures now called pot-metal and bell-metal. After the time of Valerian and Gallienus coinage of brass, with a small addition of silver, is that authorized by the state, being that of the "denarii aërii." The coins of lead or copper, plated with gold or silver, are those of Roman forgers. Coins have been found in lead of undoubted antiquity. Some such of Tigranes are mentioned as genuine by Jobert; but they are now well known to be forgeries. An ancient writer informs us, that tin money was issued by Dionysius, one of the Sicilian tyrants; but no such coins have been found. In Rome leaden coins must have been pretty ancient, for Plautus mentions them in one or two passages of his plays; and a few imperial ones have been found, but they are chiefly trial-pieces, in order to enable the artist to judge of the progress of the dye. Others are those which have been plated by forgers, but the covering worn off.

It has been said that there are also some medals composed of two different metals, not by melting them together, but either by plating over brass or iron with silver; a sort of false money, which had its rise in the triumvirate of Augustus; or by laying a rim of a different metal round the edge of a medal. Those of the latter sort are called by antiquaries *contorniatæ*, from the French *contour*, which signifies the outline that defines a figure. See CONTOURNIATED.

It is considered as a certain rule in this science, says Pinkerton, that none of the ancient money was cast in moulds, except the most ancient and very large Roman brass, vulgarly called weights, and other Italian pieces of that sort. All other cast coins are forgeries of ancient or modern times: for this was a manœuvre of the ancient forgers, as we learn from several Roman moulds which have been found, and which have led the unskilful to imagine that the ancients first cast their money in dyes, and then stamped it, to make the impression more deep and sharp. Dr. Jennings, in his "Introduction to the Knowledge of Medals, &c." 1764, 12mo., has fallen into this mistake, besides several others which are noticed by Mr. Pinkerton. The ancients, though strangers to the art of impressing legends upon the edge of their money, like the "*DEUS ET TUTAMEN*" upon our crown pieces, and to the fine indentation observable on our gold, yet knew something of crenating the edges of their coin. This they did by cutting out regular notches on the edges. Some of the Syrian coins, and of the Roman consular, with a few other early ones, are ornamented in this manner. The former were cast in this shape, then struck; the latter was done by incision to prevent forgery, by shewing the inside of the metal. They were anciently called "*ferrati*," and Tacitus says, that the Germans preferred them to other Roman coins. But this was also imitated by the old forgers; and Mr. Pinkerton has in his possession a serrated consular coin, of which the incisions, like the real, are plated with silver over copper.

Medals may again be distinguished by their different sizes. The size of the ancient medals is from three inches to one-fourth of an inch in diameter. Those of the larger size or volume are called *medallions*. The others, which are very various, are ranked into three classes, viz. large, middle, and small; and the class is determined, not so much by the breadth and thickness of the medal itself, as by the size of the

MEDALS.

the head that is stamped upon it. The shape of medals is rather roundish than perfectly round. No Roman or Etruscan coins have been found of the globular form, or indented on the reverse, like the early Greek. The first Greek coins are small pieces of silver, while the Roman are large masses of copper. The former are struck; the latter are cast in moulds.

MEDAL, the Parts of a, are the two sides; one whereof is called the *face, head, or obverse*, the other the *reverse*.

On each side is the *area*, or field, which makes the middle of a medal; the *rim*, or border; and the *exergue*, which is beneath the ground whereon the figures represented are placed. (See **EXERGUE**.) On the two sides are distinguished the *type*, and the *inscription* or legend. The *type*, or device, is the figure represented; the *legend* is the writing, especially that around the medal; though, in the Greek medals, the inscription is frequently in the area. See **LEGEND**.

What we find in the exergue is frequently no more than some initial letters, whose meaning we are usually unacquainted with; though sometimes too they contain epochs, or words that may be accounted an inscription. The exergue contains sometimes the date of the coin, expressing in what consulship of the emperor it was struck: as *cos III.* upon the reverse of an Antoninus. Sometimes it signifies the place where it was struck, and to which the coin properly belonged, as *S. M. AL.* for *signa Moneta Alexandria*, upon the reverse of a Licinius. Sometimes the name of a province, the reduction of which the medal is designed to celebrate; as *Judæa* in the reverse of a Vespasian.

On the face of medals we have commonly the portrait of some great and illustrious person; usually, if not always, in profile. The coins of the kings of Macedon are the most ancient of any yet discovered on which portraits are found; and Alexander I., who began his reign about 500 years B.C. is the earliest monarch whose medals have yet been discovered. Then follow those kings and queens who reigned in Sicily, Caria, Cyprus, Heraclea, and Pontus. To these succeeds the series of kings of Egypt, Syria, the Cimmerian Bosphorus, Thrace, Bithynia, Parthia, Armenia, Damascus, Cappadocia, Paphlagonia, Pergamus, Galatia, Cilicia, Sparta, Præonia, Epirus, Illyricum, Gaul, and the Alps. This series extends from the time of Alexander the Great to the birth of Christ, comprehending a period of about 330 years. The last series of ancient kings descends to the fourth century, and includes some of Thrace, the Bosphorus, and Parthia; those of Commagene, Edessa or Osrhoene, Mauritania, and Judæa. The portraits of the kings above enumerated are found on medals struck with Grecian characters.

The Roman emperors present a most distinct series from Julius, the first of them, to the destruction of Rome by the Goths, or even to a much later period, if the coins after this were not so barbarous as to destroy the beauty of the series while they add to its perfection. Of modern coins many proper serieses might be formed, consisting of the kings and other potentates of the different countries. Medals of illustrious men in modern times are not likewise wanting to form a collection.

The kings, upon Greek coins, have generally the diadem, without any other ornament. The side face is always preferred; though upon very ancient Greek coins of cities, and Roman consular coins, full faces are found of amazing relief and expression. Sometimes several heads are found on the same coin, either impressed on both sides, or only upon one. Thus the beautiful gold coin of Ptolemy Phi-

ladelphus, king of Egypt, bears his own head and that of Arsinoë, his queen, on one side; and those of his father and mother, Ptolemy I. and Berenice, on the other. Coins are found also of Antioch and Cleopatra, Nero and Agrippina, Agrippina and Germanicus, and many others, both Greek and Roman. Sometimes two or more heads are found upon one side, while the other bears a reverse in the usual way. These heads are either *adverse*, that is, opposite to each other, face to face; or *joined*, and both looking one way. Of the adverse are coins of Licinius, father and son, and others. Joined heads are found on the finest Greek coins, as in that of Ptolemy above-mentioned, and in the Roman are Commodus and Marcia his concubine, and others. Sometimes real portraits are joined with ideal ones, as Carausius and Apollo, Posthumus and Hercules, &c. Sometimes three heads are found upon one side, as in that of Valerian, with his sons Gallienus and Valerian, &c. All such coins are very rare and valuable.

As for the ornaments of portraits, the chief is the diadem, or "vitta," which was a ribbon worn about the head, and tied in a floating knot behind, anciently the simple, but superlative, badge of kingly power. It is observable upon the Greek monarchic medals, from the earliest æra to the last; and is almost an infallible sign of the portrait of a prince. In the Roman coins it is seen on the consular one with Numa and Ancus; but never after, as Mr. Prokerton apprehends, till the time of Licinius.

The Romans had such an abhorrence of this badge of kingly distinction, that their emperors had, for two centuries, wore the radiated crown, peculiar to the gods, before they dared to assume this tyrannic badge. However, in the family of Constantine the diadem became common, but divested of its ancient simplicity; being ornamented on either side with a row of pearls, and various other decorations. The radiated crown, at first, as in the posthumous coins of Augustus, a mark of deification, was, in little more than a century after, put upon most of the emperors' heads in their several medals. The crown of laurel, at first the honorary prize of conquerors, was afterwards commonly worn, at least in their medals, by all the Roman emperors from Julius, who was permitted by the senate to wear it always, in order to hide the baldness of his forehead. In the lower empire, the laurel is often held by a hand above the head, as a mark of piety. Agrippa appears on his coins with the rostral crown, a sign of naval victory or command, being made of gold, in resemblance of prows of ships tied together. He is likewise seen with the mural or turreted crown, the prize of first ascending the walls of an enemy's city. The oaken, or civic crown, is frequent on reverses, as of Galba and others; and was the badge of having saved the life of a citizen, or of many citizens. (See **CROWN**.) Besides the diadem, the Greek princes sometimes appear with the laurel crown. The Arsacidæ, or kings of Parthia, wear a kind of fash round the head, with their hair in rows of curls like a wig. Tigranes, and the kings of Armenia, wear the tiara. Xerxes, a petty prince of Armenia, appears on a coin in a conic cap, with a diadem around it. Juba, the father, has a singular crown like a conic cap, all hung with pearls.

The successors of Alexander assumed different symbols of deity on the busts of their medals; such as the lion's skin of Hercules, surrounding the head of the first Seleucus; the horn placed behind the ear, an image of their strength and power, or of their being the successors of Alexander, called the son of Jupiter Ammon; the wing, placed in like manner behind the ear, symbolic of the rapidity of their conquests,

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quests, or of their descent from the god Mercury, &c. Pyrrhus, as Plutarch informs us, had a crest of goat's horns to his helmet; and the goat was a symbol of Macedon. The successors of Alexander might take this badge on that account. The helmet also appears on coins, as in those of Macedon under the Romans, which have Alexander's head, sometimes covered with a helmet. Probus has the helmet: and Constantine I. has helmets of different forms, curiously ornamented.

The Greek queens have the vitta or diadem. Most queens of Egypt have the sceptre. The Roman empresses never appear with the diadem, the variety of their head-dresses compensating the want of it. The remarkable part of the Roman head-dress among the ladies was the "Sphendonæ," or sling, on the crown of the head, which was of gold, and so prominent, as to be even remarkable on a coin. Sometimes the bust of an empress is supported by a crescent, denoting that she was the moon, as her husband was the sun of the state. There are other symbolic ornaments of the head observable on some Roman coins. Such is the veil, or rather toga, drawn over the head, and seen on the busts of Julius Cæsar, when Pontifex Maximus, and others. Latterly the veil was only a mark of consecration, and is common on coins of empresses, as Faustina and others. In the coins of Claudius Gothicus, it is first found as a mark of the consecration of an emperor; and it was continued in those of Constantian I., Maximian I., and Constantine I. These coins, says Mr. Pinkerton, rank with those that are valuable for their rarity.

The "nimbus," or glory, now peculiar to the saints, was formerly applied to emperors. A nimbus appears round the head of Constantine II., in a gold coin of that prince, and of Flavia Maxima Faustina, in a gold medallion; and of Justinian in another. But the idea is as ancient as the reign of Augustus. Havercamp gives a singular coin, which has upon the reverse of the common piece with the head of Rome, *URBS ROMA*, in large brass. Constantine I., sitting amid victories and genii, with a triple crown upon his head for Europe, Asia, and Africa: legend *SECURITAS ROMÆ*. This medal, says Pinkerton, might haply have afforded a curious argument, in an ignorant age, for Constantine's donation to the pope, and for the papal triple crown. But in fact the universal spiritual power of the pope was totally unknown till the 12th century; before which time his election was obliged to be confirmed by the exarch of Ravenna, and afterwards by the emperor of Germany; and his temporal power is so late as the beginning of the 16th century, only commencing in the crimes of Borgia. The bust alone is generally given on ancient coins; but sometimes half the body, or more; in which latter case the hands often appear, with tokens of majesty in them. Such is the globe, said to have been introduced by Augustus, to express possession of the world; the sceptre, sometimes confounded with the consular staff; the roll of parchment, symbolic of legislative power; and the handkerchief, expressing that of the public games, where the emperor gave the signal. Some princes hold the thunderbolt, shewing that their power on earth was equal to that of Jupiter in heaven. Others hold an image of victory.

The reverses of medals contain figures of deities at whole length, with their attributes and symbols; public buildings and diversions; allegorical representations; ceremonies civil and religious; historical and private events; figures of ancient statues; plants, animals, and other subjects of natural history: ancient magistracies, with their insignia; and, in short, almost every object of nature or art. Some reverses bear

the portrait of the queen, the son, or the daughter of the prince who appears on the obverse. Such are highly esteemed by antiquaries, not merely because coins stamped with portraits on both sides are valuable, but because they identify the personage on the reverse to have been the wife, the son, or the daughter, of such a particular prince, and thus help in the adjustment of a series. Some medals with two portraits are very common; such are Augustus reverse of Caligula, and M. Aurelius reverse of Antoninus Pius. The reverses of the Roman coins have more of art and design than the Greek; but the Greek have more exquisite relief and workmanship than the other. In the very ancient coins, no reverse is found except a rude mark struck into the metal, as of an instrument with four blunt points, on which the coin was struck. Afterwards, by degrees, we see some little image of a dolphin, or other animal, inserted into one of the departments of the rude mark, or into a hollow square. Then follows a perfect reverse of a horse, or the like, with a slight mark, and at length without any mark, of the hollow square. Some ancient Greek reverses are struck in intaglio, not in cameo, hollow, not in relief. Such are those of Caulonia, Crotona, Metapontum, and some other ancient cities of Græcia Magna. These reverses sometimes bear the same type in intaglio, which the obverse has in cameo; and sometimes they are quite different. When complete reverses appear on the Greek coins, about 500 years B.C. they are of exquisite relief, minute finish, and beauty. The very muscles of men and animals are seen, and will bear inspection with the largest magnifier, as ancient gems.

Of Roman coins, the reverses are very uniform, the prow of a ship, a car, or the like, till about 100 years B.C., when various reverses appear on their consular coins in all metals. The variety and beauty of the Roman imperial reverses are well known. The medallist much values those which have a number of figures, as the "Puellæ Faustinae" which has twelve figures:—that of Trajan, "Regna adsignata," which has four:—the "Congiarium" of Nerva, with five:—the "Allocution" of Trajan, with seven; of Hadrian, with ten; of Probus, with twelve. Some Roman medals, to which no peculiar name has been appropriated by medallists, have small figures on both sides, as the "Apolloni Sancto" of Julian II. Others have only a reverse, as the noted "Spintriatii," which have numerals I. II. &c. on the obverse.

The figures of deities and personifications on the Roman coins, are commonly attended with their names, besides being distinguished with their attributes. These names, without an adjunct, are put down merely because it was necessary that the coin should have a legend. Thus, in a coin of Lucilla, Venus, though well known by the apple which she always holds in her hand, has nevertheless the name round her, *VENUS*, without any addition. But an adjunct is most commonly added, and this renders the insertion of the name very proper and necessary, as in the instance of a Neptune, with *NEPTUNO REDUCI*:—a Venus, with *VENERI VICTRICI*, and others similar. The like may be said of the coins with a figure of Modesty, *PUDICITIÆ AUGUSTÆ*; of Virtue, *VIRTUS AUGUSTI*, &c.; for it is the legend which appropriates the virtue to the emperor or empress, and thus leaves no doubt as to the meaning of the reverse.

In the Greek coins, a superior delicacy is observed by not expressing the name of the deity, but leaving it to the easy interpretation of fixed symbols. This remarkable difference is observable in the earliest coins of the two countries, on which only the bust of the deity or personification is given.

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The Romans have almost always the name, as *PIETAS*, *LIBERTAS*, &c., while the Greeks content themselves with giving Ceres with her wheaten garland; Jupiter with his mild countenance, laurel crown, and beard; Minerva with her helmet, &c. &c.

Mr. Pinkerton has given an account of the symbols found on the Greek coins, and also of those very few on the Roman, which are not immediately illustrated by the legend of the medal. The principal deities symbolized in the Greek coins, as divided into male and female, are as follow: 1. *JUPITER*, in the first rank of gods, occurring frequently on reverses of Alexander the Great, and easily known by his eagle and thunderbolt: when the bust only occurs on obverses of coins, it is known by the laurel crown, and placid bearded countenance. Jupiter Ammon is distinguished by the ram's horn twirling round his ear. 2. *NEPTUNE* seldom occurs on the coins of Greece; but when he appears, he is well known by the trident, or the dolphin, and is sometimes drawn by sea-horses. His bust has a trident behind. 3. *APOLLO* is frequently seen on the reverses of the Syrian princes, and is known by the harp, the branch of laurel, or the tripod; sometimes he has a bow and arrows. When the bust only occurs, he has a fair young face, and is covered with laurel; and in the character of the sun, his head is surrounded with rays. 4. *MARS*, often seen on Greek civic medals, is distinguishable by his armour, and sometimes by a trophy on his shoulders. The bust is known by the helmet and ferocious countenance. 5. *MERCURY* appears with the "caduceus," or wand twined with serpents, and the "marsupium," or purse, which he holds in his hand. He is delineated as a youth, with a small cap in his hand, and wings behind his ears and at his feet. The bust is known by the cap, which resembles a small hat, and the wings. 6. *ÆSCULAPIUS* is remarkable on account of his bushy beard, and his leaning on a club with a serpent twisted round it. He is sometimes seen with his wife Hygeia, or Health, and their little son Telesphorus, or Convalescence, between them. 7. The attributes of *BACCHUS* are the tiger, the satyrs around him, the "thyrsus," or rod twisted with ivy or vine, and the crown composed of one of those plants. His bust is known by the latter symbol, and by the diadem and horn. 8. The club, lion's skin, and sinewy strength, reveal *HERCULES*; with sometimes the addition of a cup, denoting that wine inspires courage, and the poplar tree, symbolic of vigour. He often appears as breaking the neck of the Nemean lion, by crushing it in his arms. His bust is common on the obverse of coins of Alexander the Great, and other princes, and those of Sicilian cities: it is that of a youth without a beard; with the lion's skin wrapped around it; and on the coins of Alexander has been erroneously taken for the portrait of that prince. He is sometimes drawn with a beard, and called Hercules; without it he is denominated the young Hercules. 9. *SERAPIS*, one of the fantastic gods of Egypt, is known by his bushy beard, and the measure upon his head. *APIS* appears as a bull, with a flower of the *lotos*, lotos, the water-lily of the Nile. Macrobius says it was a symbol of creation; and Janblichus says that Osiris was supposed to have his throne in it. (See *LOTOS* and *LOTUS*.) 10. *HARPOCRATES*, the god of silence, is known by the familiar token of putting his finger to his mouth. He has sometimes the "siltrum" in his left hand, which is a symbol common to most of the Egyptian deities. 11. *CANOPUS* is very common on the coins of Egypt, in the singular shape of a human head, placed upon a kind of pitcher. (See *CANOPUS*.) 12. To the above-mentioned symbolized gods we may subjoin the *ΙΕΡΑ ΣΥΝΚΛΗΤΟΣ*, and *ΙΕΡΟΣ ΔΗΜΟΣ*, the holy senate, and holy people, so

frequent on Greek imperial coins. These ideal persons are commonly seen in the same image of an ancient bearded head, crowned with laurel: sometimes both appear as youths.

Among the female deities, the first in dignity is, 1. *JUNO* known by the peacock, a bird sacred to her from the fable of Argus. As the goddess of marriage, she is veiled to the middle, and sometimes to the toes. Her bust is that of a beautiful young woman, sometimes without any badge, which sufficiently distinguishes her, as the rest of the goddesses have badges; and sometimes with a diadem. 2. The symbols of *MINERVA* consist in her armour, with a spear in her right hand, and the "argos," or shield with Medusa's head, in the other; an owl commonly standing by her. Her bust is distinguishable by the helmet, which she always wears: this is very common on the gold coins of Alexander the Great. 3. *DIANA* is manifest by the crescent, by her bow and arrows, and often by her hounds. The Ephesian Diana, common upon Greek imperial coins, appears with a number of "maamæ," being supposed the same with universal nature; she is supported by a couple of deer, and bears on her head a pannier of fruit. The bust of Diana is known by the crescent on her brow, and sometimes by the bow or quiver engraven on one side. 4. *VENUS* is declared by the apple in her hand, the prize of beauty. Sometimes she may be known by her total want of dress, without any other symbol. Her bust is distinguishable by her supreme beauty, and is often adorned with pearls around the neck. We may here mention that *CUPID* sometimes appears on the Syrian coins, in half-length, as the painters call it, and is known by his infancy and wings. 5. *CYBELE* has the turreted crown and lion; or is seen in a chariot drawn by lions. Her bust is known by the first mentioned attribute. 6. *CERES* has the torches in her hands, with which she is fabled to have gone in search of her daughter Proserpine. She has sometimes two serpents by her, and is sometimes drawn in a chariot by them. Her bust is readily known by the wheaten garland, and is most common on coins of Sicily, an island celebrated for its fertility. Her daughter, Proserpine, is also common with the name *KOPH*, or the *girl*. 7. *ISIS*, an Egyptian goddess, has the sistrum in her hand, and a bud, or flower, on her head, symbolic of the eternal bloom of the inhabitants of heaven. The flower is said to be that of the *αβροβιον*, or southern-wood; but most probably it is a species of amaranth. 8. *ASTARTE*, a Sidonian goddess, appears on a globe, supported by a chariot of two wheels, and drawn by two horses.

Mr. Pinkerton enumerates other deities that are less frequent on Greek coins; such are Saturn with his scythe, or his bust with a hook on those of Heraclea:—Vulcan's head, with his tongs:—Adranus, a Sicilian god, with his dog:—Anubis of Egypt, with his dog's head:—Atis, in the Phrygian bonnet:—Castor and Pollux, with a star on the head of each:—Dis, having an old face with dishevelled hair and beard, and a hook:—Flora, crowned with flowers, on coins of Marseilles:—Nemesis, with a wheel:—and Pan with small horns and brutes' ears. Some symbols are figurative of persons or circumstances: such are vases, with sprigs of plants issuing out of them, symbolic of solemn games:—the small chest, or hamper, with a serpent leaping out of it, exhibiting the mystic rites of Bacchus, coins with their image being called "Cistophori":—the anchor, on Seleucian medals, ascertaining their having been struck at Antioch, where an anchor was found in digging the foundation of the city, though at a considerable distance from the sea:—Apollo sitting upon a singular seat, resembling a hamper inverted, perhaps a tripod with a covering of net-work,

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work, on different coins of the princes of Syria:—the bee, a mark of Arilteus, son of Apollo and Cyrene, much worshipped in the isles of the Adriatic and Ægean seas:—the laurel of Apollo:—ivy and grapes of Bacchus:—the poppy of Ceres and of Proserpine:—corn of Ceres:—owl and olive of Minerva:—dove of Venus:—and torch of Diana, Ceres, and Proserpine. The *μυδρος*, *mudrus*, or conic stone, was a token of the Sun, of Belus, and of Venus.

The most remarkable symbols of countries and cities on Greek coins are the flowers of the pomegranate for Rhodes:—owl for Athens:—pegasus for Corinth:—wolf's head for Argos:—bull's head for Bœotia:—minotaur's head, and the labyrinth, for Crete:—horse's head for Phœnalis:—lion for Marseilles:—tortoise for Peloponnesus:—sphinx for Scio:—three legs joined for Sicily:—and a horse for Thessaly. The badge of Byzantium was the crescent, which appeared early on the coins of Byzantium, with the legend *ΒΥΖΑΝΤΙΝΗ ΣΩΤ.*; the preserver of Byzantium. The occasion was this; when Philip of Macedon besieged Byzantium, and was proceeding to storm it in a cloudy night, the moon shone out, and discovered his approach, so that the inhabitants observed and repulsed him. The Turks, upon entering Constantinople, found this ancient badge in many places; and suspecting some magical power in it, assumed the symbol and its power to themselves; so that the crescent is now the chief Turkish ensign. (See *CRESCENT*.) The bull is very frequent on Greek coins, signifying, as Mr. Pinkerton suggests to be the most probable opinion, a river, on which the country or town was situated: accordingly, the river Acheilus is called *Βουκεφαλος*, or bull-headed, by Sophocles in *Trachin*, v. 13: and Cephissus is said to have *ταυρομορφου ομοια* *Κηφισου παλαιο*; by Euripides, *Ion*, v. 1261. The Latin poets speak of the horns of rivers; thus Horace describes the Aufidus, “*Sic tauriformis volvitur Aufidus.*” The bull was a token of fertility, but the horns seem to allude to the force of the stream, &c. See *CORNUCOPIA*.

On Roman coins the deities and personifications have not only attributes, but their names likewise in the legend of the medal, so that it is not necessary to dwell upon the explanation of them. Some, however, it may not be improper to mention. On the reverses of Roman colonial coins, easily distinguished by their rude fabric, and the name of the colony on them, commonly beginning with *COL.*, when an ensign stands alone, and without any persons, it shews a colony drawn from one legion; but when the ensigns or banners appear in the like circumstances, they evince the colony to have been drawn from as many legions as there are ensigns. A bull on these coins often represents Apis as a symbol of strength and security: such was, probably, the bull upon the reverse of the common coin of India, with two stars over him, and the legend *SECURITAS REIPUB.* The caduceus marks peace and concord; the *cornucopia*, abundance; the pontifical hat, the priesthood. They all appear upon a reverse of Julius, and are symbols of the concord of the empire, and the plenty which attended his power: the last symbol merely denotes that Cæsar was Pontifex Maximus. The “*parazonium*” on Roman coins was a baton of command, and not a pointless dagger, as it has been described by many antiquaries. In later times the globe on an altar, with three stars, is supposed to typify the world preserved by the gods for the three sons of Constantine I. The fort and the gate are symbols of security. The altar is a well-known mark of piety: the tripod was a portable altar, used in temples for liquid offerings, as the altar was for solid sacrifice. A dolphin is sometimes twined among the legs of the tripod; the dolphin was sacred to Apollo, as appears from Servius on the 3d Æneid. The “*lectist-*

terna” also appear on medals. (See *LECTISTERNIUM*.) The instruments of sacrifice appear on many Roman coins: such are the “*secespita*,” or oblong hatchet, or large knife for killing the victim:—the “*asperforium*,” a vessel for holy water, with which the priest sprinkled the assistants:—the “*simpullum*,” or vessel for pouring wine on the sacrifice:—the “*patina*,” or “*patera*,” a dish for the fat, and other portions sacred to the gods:—and the “*acerra*,” or little coffer for incense. The “*lituus*,” or wand twisted round at the top, somewhat like the episcopal staff, is a badge of the augurship, as the “*apex*,” or cap with strings, and terminating with a tuft, is of the pontificate. (See *LITUUS*.) The “*thensa*,” or divine chariot, which carried the image of a deity in sacred processions, (improperly termed “*carpentum*” by some,) is a badge of consecration of an empress; as is also the peacock, which was the bird of Juno, the queen of heaven. These sometimes appear without the legend “*consecratio*,” as the *thensa* on a coin struck under Tiberius for the consecration of Livia, the wife of Augustus, called Julia, *S. P. Q. R. IULIÆ AVGVST.*; and the peacock on that most rare gold coin of Julia, the daughter of Titus, the front of which has her bust, *IULIA AVGVSTA*, and the reverse a peacock, *DIVI TITI FILIA*. The eagle is the sign of consecration of an emperor.

The palm-tree, on both Greek and Roman coins, is symbolic of Phœnicia, where that tree flourished; as the silphium is of Cyrene, from the earliest times down to those of the Roman empire. Pinkerton's *Essays*, vol. i.

The titles are generally found upon the face of the medal. These are titles of honour, as *Imperator*, *Cæsar*, *Augustus*, given to all the Roman emperors after Octavianus; *Dominus*, first assumed by Aurelian, and used by his successors (see *DOMINUS*): other titles are ascribed to particular persons on account of their virtues, as *Pius* to Antoninus, assumed also by Commodus, with the addition of *Felix*; *Pater Patræ*, first bestowed on Cicero for discovering and defeating the conspiracy of Cataline, and afterwards assumed by the emperors; *Iustus*, the title of Pescennius; *Beatissimus* and *Felicissimus* of Dioclesian; *Optimus* and *Clemens*, decreed to Trajan by the senate; *Maximus*, assumed by Constantine; and *Invictus*, by Victorinus. In the lower empire, *Stauracius* first, and then Michael Ducas, and others, assumed the proud addition of *ΒΑΣΙΛΕΥΣ*, or king; which was followed by that of *ΔΕΣΠΟΤΗΣ*, or despot. Other titles are the names of offices; as *cos.* for consul, with a number annexed to it, signifying how many times the person had been thus elected: *Tribunitia potestas*, with the year of the tribuneship commonly expressed after the title, as *TRIB. POT. X.* or *XVI.* &c. The office of *Pontifex maximus*, expressed among their titles, from Augustus to Constantine, by whom it was refused: it was re-assumed by Julian, and laid aside by Gratian. Julius Cæsar assumed the title of *Dictator perpetuus*; Claudius, that of *Censor*; and Domitian made himself *Censor perpetuus*.

The large early copper coins only bear *ROMA* in the reverse. Afterwards we find the names and titles of the *Quæstor* or Director of the public treasury, the *Triumviri* who managed the mint, the *Prætor*, the *curule Edile*, the *Edile* of the people, the *Præfect* of the city, the *Pontifex Maximus*, *Augur*, *Quindecimvir sacris faciundis*, *Flamen Martialis* and *Quirinalis*, *Septemvir Epulonum*, and latterly, *Triumvir Reipublicæ constituendæ*, and *ad Frumentum emundum*. Of the great magistrates out of Rome, who had moneys with them, in order, from bullion and the spoil of the enemies, to coin money for paying the troops engaged in foreign service, we have the names and titles of *Imperator*, *Proconsul*,

Proconsul, Proprator, Legatus, Legatus pro Pratore, Quæstor, Proquæstor, Legatus Classis, Triumvir Coloniae deducendæ, or reficiendæ sacris ædibus. All these titles appear on the reverse of what are called consular coins; while the obverse bears the head of a deity, generally without a legend. In time the magistrates put the head of some illustrious ancestor on the coins, with his name; as Numa, Ancus Martius, Quirinus or Romulus, Brutus, Alula; Caius Cælius Caldus, obverse of Caldes III. vir, and the like. This led the way to Cæsar, who first put his own head on his coins, when made perpetual Dictator; with the legend of names and titles on the obverse, and not on the reverse as before. The inscription VOT. V. MVLT. X. VOT. X. MVLTISAN. occurs on many reverses of Roman medals, and most commonly marked on a shield, or within a crown of laurel. This Du Cange interprets to refer to the artifice of Augustus, who pretended to lay down his power, and resume it for 10 years longer as at the request of the senate. This term, he says, was by succeeding emperors shortened to five; and solemn vows were entered into by their subjects for their safety to the end of that period; nay, that the double of that period might be allotted to their reign, again to be prolonged, on the wishes of their people, to a future date. This inscription is also found upon coins of Crispus, and other Cæsars, or heirs of the empire; and it hence appears, that the honour of such solemnities was also conferred on them, who created Cæsars. The "Vota Decennalia," as on coins of Pertinax and of Papianus, were only vows to perform the Decennalia, if the emperor should reign 10 years; whereas "Primi Decennales," or "Secundi Decennales," imply these games to have been actually performed; and the emperor to have reigned 10, or 20 years. On coins of Lucilla, Hadrian, Severus, Caracalla, and others, we find VOTA PVBLICA, with a sacrifice; shewing that the vows were undertaken, with that rite, as they were afterwards performed with solemn games and rejoicings. Coins of Constantine II., and of Constantian, only bear SIC. X. SIC. XX. to express the wishes of the people, that, as the emperors had happily reigned 10 years, so they might reign 20. There were also "Vota Quinquennalia" for the emperor reigning five years, and games called "Quinquennalia" performed when he had accomplished that period. From Aurelius Victor, in his life of Gordian III., it appears that Nero introduced this practice; which is mentioned by Tacitus, and by Lampridius in his life of Diadumenus. There were also "Vota Novi Anni," as appears from Spartian's life of Hadrian, and from Dio, l. 58; and there is a coin of Antoninus with S. P. Q. R. A. N. F. F. OPTIMO PRINCIPI, Senatus populûsque Romanus annui novum fastum felicem, &c. *i. e.* the senate and people of Rome wish a prosperous and happy new year to the best of princes. See LEGEND.

MEDALS, *Greek*, claim that place in a cabinet from their antiquity, which their workmanship might ensure to them, independently of that adventitious consideration. The invention of coinage, as we have elsewhere observed, is ascribed by Herodotus to the people of Lydia, upwards of 1000 years before the Christian era. The abbé Barthelemy, cited by Mr. Pinkerton, arranges the following stages of the progress of coinage. 1. Coins without any impression. 2. Those with a hollow indented mark or marks on one side, and impression in relief on the other. This class, it is suggested, seems to extend from about the year 900 before our era, to about 700. 3. Such as have an indented square divided into segments, with a small figure in one of the segments, the rest being vacant; and impressions on the obverse, as usual. These may extend to the year 600 B. C. 4. Those which are struck hollow on the reverse, while the obverse is

in relief commonly with the same figure; which coins may be considered as of equal age with those in the last class. 5. Coins in which a square dye is used, either on one or both sides. These were discontinued about the year 420 B. C. 6. Complete coins both in point of obverse and reverse. Some of these occur in Sicily, where this art was carried to a perfection unknown in any other country, so early as the time of Gelo, who began his reign in the year 491 B. C. Coins of most remote antiquity, say, Froelich, quoted by Pinkerton, may be distinguished by these infallible marks. 1. Their oval circumference, and globe swelling shape. 2. Antiquity of alphabet. 3. The characters being retrograde; or the first division of the legend in the common style, while the next is retrograde. 4. The indented square. 5. The simple structure of the mintage. 6. Some of the very old coins are hollowed on the reverse, with the image impressed on the front. 7. The dress, symbols, &c. are often of the rudest design and execution. The coins of Possidonia, Crotona, Sybaris, and two or three other cities, bear these marks of profound antiquity. Some Persian pieces, with the archer upon one side, and the hollow square upon the other; and several coins of the first kings of Macedon, are examples. In the British Museum, there is a medal of silver ascribed to Leobus, of this description. In a short time the Greeks assumed great elegance; and it is observed by Mr. Pinkerton, that innumerable of the medals of cities, which, from the character, we must judge to be of the highest antiquity, have a surprising strength, beauty, and relief, in their impressions. About the time of Alexander the Great, the art seems to have attained to its very highest perfection. Of the Greek medals, those of cities are the most ancient. The civic medals are generally stamped on the obverse, with the head of the genius of the city, or some favourite deity; while the reverse often presents some symbol used by the city, at the time when the piece was struck. The legend contains the initials, monogram, or whole characters of the name of the city. Some connoisseurs prefer the regal coins of Greece; others the civic. The former interest by their portraits; the latter by their variety. The former are perhaps more important to ancient history; and the latter to ancient geography. The civic coins are interesting, as they present us with a view of the customs, religion, &c. of ancient cities; they likewise afford a kind of political barometer of the wealth and power of each city and country. *E. G.* The numerous and beautiful gold coins of Cyrene, a country, from its remote situation, little known in history, afford sufficient proofs of its great power and wealth. The small civic coins of gold, electrum, and silver, struck in Asia Minor, are perhaps some of the earliest; though if we judge from workmanship, these coins are so exquisite, that the coins of Greece, from their rudeness, seem to claim priority of era; and Mr. Pinkerton suggests, that it is dubious whether Greece or Lydia first invented coinage.

The Greek monarchic coins are often of the same construction with the civic; only that they bear the name of the prince on the reverse; many such occur with the bust of some deity in front, for one which presents the image of the prince. The most ancient series is that of Macedon, commencing, as we have observed already, with Alexander I., who began his reign 501 years before our era. With Philip, the Macedonian coins begin to be beautiful. Those of Alexander the Great are wonderful. The head of Minerva on his gold, affords a variety of exquisite faces; and the coins of Alexander and his father, exceed all that were ever executed, except those of Sicily, Græcia Magna, and the ancient ones of Asia Minor. Sicilian coins are famous

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for workmanship, even from Gelo's time. The coins of the Syrian kings, successors of Alexander, almost equal his in beauty. Those of Antioch VI. are peculiarly exquisite, both for the beauty of the coin and that of the king. The Egyptian Ptolemies have fine relief, but do not equal the Syrian in delicacy and finish. The family coin of Ptolemy Philadelphus, before mentioned in this article, is extremely fine and interesting. There is a coin of Alexander, son of Neoptolemus, king of Epirus, with a head of Jupiter Dodonæus, crowned with oak, of miraculous workmanship, and thought to be done in Magna Græcia, when he came to assist the Tarentines. This has been engraven by Bartolozzi. Even the earlier Parthian coins of the Arsacidæ are worthy of the Grecian workmen, whose they are, as is evident from the Greek legends impress on them, in many of which these monarchs assume the title of ΦΙΛΕΛΑΗΝΟΣ, or lover of the Greeks. It is to the Greek coins that were struck before the Roman empire swallowed up the Greek cities and sovereignties, that the high praise bestowed by good judges upon the Greek mint, must be chiefly confined; for the Grecian imperial medals are not equal to the former, though they do not always yield to the Roman.

In the series of Grecian imperial coins, we meet with very uncommon portraits and reverses. In attention to the fair sex, the people of Mitylene, the chief city of Lesbos, and the birth-place of Sappho, have peculiarly distinguished themselves. Those Greek coins of cities, which have the head of an emperor or empress, are called Imperial Greek coins; but those which have no such impressions are classed with Grecian civic coins, though struck under the Roman power. Of imperial Greek coins none occur in gold; but there are those of silver of Antioch, Tyre, Sidon, Tarsus, Berytus, Cæsarea, and one or two other trading cities in that opulent and commercial region. Those of Antioch present, now and then, the genius of the city sitting, with the river Orontes flowing beneath her feet, as on coins of Syrian monarchs. Syrian silver coins sometimes bear the club of Hercules, the founder, or the famous Tyrian shell-fish, whence the Tyrian purple, our crimson, was derived. Sidon gives the car of Astarte, or a head of the goddess: Tarsus has sometimes only a monogram, expressing the name of the city. Cæsarea, in Cappadocia, abounds in silver of various sizes; and silver coins of Lycia appear to be of good work, and good metal; the reverse having two harps and an owl sitting on them. Silver coins of Gelon, a town of Sarmatia, much resemble the Syrian; and have the ΔΗΜΑΡΧ. ΕΕΘΥΣΙΑΣ, with an eagle holding a stag's foot. The Greek imperial brass coins are so abundant, that it is hardly necessary to specify any of them. Those of Antioch, generally with a Latin legend on the obverse, and Greek on the reverse, are so numerous as to furnish a series of almost all the emperors; being apparently struck for the purpose of paying the forces in the East. Those of Ceretapa, in Phrygia, are distinguished by their good workmanship, as also are those of Bithynia and Phrygia. On those of Tarsus are curious views of objects, almost in perspective; and there is a singular coin of Gangra in Paphlagonia, with a view of two castles and houses between them. This is in the late Dr. Hunter's collection. The coins of Egypt under the Roman emperors, being marked with Greek legends, range with the Greek imperial medals; they are remarkable for thickness, and baseness of metal. Those of the silver series are at first about the size of an half crown, but three times as thick; after the time of Commodus, they declined both in size and baseness, and became reduced to the size nearly of a sixpence, and the metal is only bad brass washed with silver. The silver coins of Egypt are not so well done from Augustus to Nero, as

afterwards. From Nero to Commodus, they are often admirable, and of a style of workmanship that can be called neither Greek nor Roman. The reverses are extremely various and singular, exhibiting the capricious religion and manners of the people. From Commodus the Egyptian silver gradually declines till the reign of Constantius I., when it ends. The series consists of 1000 coins, or more. Many scarce portraits of emperors and of empresses decorate the series. The Egyptian brass coins of the Roman period claim notice. Until Vespasian there are only two sizes, equal to the second and third Roman brass. Vespasian indulged the Egyptians with the privilege of issuing large brass, as used in Rome itself. All the Egyptian Othos, the most common coins of that prince in brass, are of the second size; and bear for reverse an head of Isis, or Serapis, with L.A. or year first. Some have names of towns, and in Dr. Hunter's cabinet, there is a fine one of Cebennutus in first brass, of Domitian, who appears decorated with a wheaten, as Gallienus does in Roman gold. On the brass coins of Egypt, a female figure, with part of a ship in her hand, and the Pharos behind, is very common, probably expressive of Alexandria. One of Antoninus Pius, in third brass, presents to us Isis sitting on the flower of the lotus. With this emperor very fine work begins in the Egyptian brass. The 12 coins of this prince, with the 12 signs are very curious, and published by Barthelemy, Mem. de l'Acad. xli. The last brass coins of Egypt, are of Marcia Otacilia Severa, wife of Philip the Elder, A.D. 244. The genuine brass coins of Egypt are thinner than the silver, and of a distinct fabric.

MEDALS, Roman. It was in the reign of Servius Tullus that the first Roman coins appeared, which were large pieces of brass, rudely impressed, only on one side, with the figure of an ox, a ram, or some other animal, whence, it is said, money was denominated "pecunia." These symbols were derived from the Tyrrheni or Etruscans, a people of Italy, originally Lydians. In process of time the impression of the *as* was changed to that of a bust of Janus, upon the front, and the prow of a ship on the reverse; and for more general use, pieces of inferior weight and value were coined. See **AS** and **MONEY**.

The Roman coins, considered as medals in a cabinet, comprehend the two grand divisions of *consular* and *imperial* coins. The Roman *consular* coins seldom or never bore the names or titles of consuls till towards the close; nevertheless they are not improperly called consular, because they were struck in the consular times of Rome. They are also called coins of families; and are always arranged alphabetically in families, according to the names which appear on them. The brass consular coins are rather uninteresting; as they consist chiefly of large unwieldy pieces, with types of insipid similarity. Few of them have any imagery or symbol. The large ancient pieces are generally kept in boxes apart, by those who are versed in them. (See **AS**.) The next coinage to that of brass was that of silver, which took place, according to Pliny, in the 485th year of Rome, that is, about 300 years after the first brass coinage, and 266 years B.C. The denarius was the first and the last form which it assumed, for the other sizes are so scarce, that it is certain very few were struck. (See **DENARIUS**.) Until the age of Julius no portrait of a living personage appears upon any Roman medal; Cæsar was indeed the first who assumed that high honour, and a competent judge asserts, that the plan of engraving on coins the names of great men and magistrates was only introduced about the time of Marius and Sylla. The reverses of some few consular medals are fraught with much erudition and curious matter. On a coin of the family of Æmilia, we have this legend, M. LEPIDUS PONT. MAX. TVIOR RE-

cus, and Lepidus appearing in the dress of a consul, and putting the crown on the head of young Ptolemy, whom his father had left to the tutorage of the Roman people. On the obverse is the turreted head of the city of Alexandria in Egypt, with ALEXANDRIA. In the late family there is a medal, with a youth on horseback, carrying a trophy, with this legend, M. LEPIDUS ANTORUM XV. P. F. P. T. A. T. I. T. I. U. S. H. O. S. T. I. U. M. O. C. C. I. D. I. T. C. I. V. I. M. S. E. R. V. A. V. I. T. Agrippa, L. Æmilius Paulus, on a coin of the same family, appears dedicating a trophy for his victory over Perseus, who, with his two children, stand by, their hands being tied behind their backs. Portraits of Bacchus, Jugurtha, the last Philip of Macedonia, the 11 and 2d Brutus, Metellus, Marcellus, Regulus, Sylla, Pompey, Cælius, and others appear on consular coins. Rome and Italy are personified; Victory crowns Rome; with other specimens of that fine personification afterward displayed on the imperial coins. Gold was first coined at Rome, 62 years after the application of the mint to silver. The general gold coin is the *Aureus*, which see. The consular coins, whose number is estimated at 200 in brass, and 2000 in silver, extend not to above 100 in gold, of which most are curious. The beautiful Pompey with his sons on the reverse, and the Brutus with his brother Lucius, commonly classed with imperial coins, should rank with the consular. Most of the gold consular coins are of great beauty and high value. Of consular medals father Joubert reckons about fifty or sixty of gold; two hundred and fifty of copper; and near a thousand of silver. Goltzius has described them in a chronological order, according to the *Falci Consulares*; and Urfinus has disposed them genealogically, according to the order of the Roman families. M. Patin has collected an entire series of them, in the same order with Urfinus; and only computes one thousand and thirty-seven consulars, which relate to one hundred and seventy-eight Roman families. M. Vaillant, and M. Morel, have also published on the same subject. See the sequel of this article. The Roman *imperial* coins claim our attention from a variety of considerations; and more particularly from the extent of the Roman empire, and from our own connection with it. The Roman coins may be called those of the emperors of Europe, and interest us like those of our own country. Some have distinguished the imperial coins into those of the *upper* and *lower empire*; the upper empire commenced under Julius Cæsar, and ended about the year of Jesus Christ two hundred and sixty; the lower empire comprehends near one thousand two hundred years; viz. till the taking of Constantinople. It is the custom, however, to account all the imperial medals, till the time of the Palæologi, among the antique; and yet we have no imperial medals of any considerable beauty, later than the time of Heraclius, who died in 641.

After the time of Phocas and Heraclius, Italy became a prey to the Barbarians; so that the monuments we have remaining of those two emperors, finish the set, or series of imperial medals. To these are added the medals of the lower empire, and of the Greek emperors; whereof a series may be made as low as our times, taking in the modern ones. M. Patin has made an ample collection of the imperial medals, till the time of Heraclius.

The Gothic medals make part of the imperial ones; they are so called, as having been struck in the times of the Goths, and in the declension of the empire, and favouring of the ignorance and barbarity of the age.

Cæsar, who begins the imperial series, was conqueror of Gaul; Claudius of Britain. As to the brass coinage it has been already observed, that at the time of Marius and Sylla, about 50 years before that of Cæsar, some elegance and variety commence in the Roman coinage. In the times of

Julius Cæsar this elegance was carried to a great height. In the family of Marcia, there is a beautiful *As*, with the heads of Numa and Ancus; the reverse Victory in a chariot, and the prow at her feet. Indeed it is only in the last named *As* that variety can be found. Sylla, as we are informed by Cicero, and by gold coins remaining, introduced great confusion into the coinage; and it is not improbable, that the brass had its share, by alteration of form and type. The imperial brass is of three sizes, *large*, *middle*, and *small*. The *large* brass form a series of surprising beauty and vast expense. In this series the various colours of the patina have the finest effect; and the great size of the portraits and figures compares to render it the most important of all the Roman coinage. It even exceeds the gold in value.

The series of the *middle* brass exceeds the former in number; but doth not present such elegance of work, or of type. Many coins are common in second brass, which have rare in brass; but very few examples occur to the contrary. Hence this series yields much to the former in price, as well as in dignity. However, many rare and curious coins occur in this series. There is a Tiberius, with this inscription on the reverse, TRIB. POT. XXVIII. A Gallienus, obverse with his head, bearing a laurel over a turret on his forehead, GENIUS P. N. reverse with this inscription ANT. URN. S. C. Coins of Paulina the elder are common in this size; but those without DIVA are very scarce, and always bear ANTONINI PII AUG.; a circumstance, which seems to indicate, that most of these coins were struck by her good husband, after her death. In the first and second brass there are many coins, which particularly interest us as Britons, because they relate to the history of this island. Such are the triumphal arch of Claudius, inscribed DE BRITANNIS, also occurring in gold and silver; the ADVENTUS AUG. BRITANNIE, and EXERC. BRITANNICUS of Hadrian; the coins of Antoninus Pius, Commodus, Severus, with a victory, VICTORIA BRITANN., but especially those personifying the country *Britannia*.

The *small* brass series abounds with curious coins. Till the times of Valerian and Gallienus, they are generally scarce; but afterward extremely common. In the former period portraits of the emperors are rare in small brass, but in the latter many are found which occur in no other series, as most of the usurpers, Zenobia, Vaballathus, and many others. All real brass coins have the s. c. till the time of Gallienus; as the senate alone had the power of striking brass, while the emperor himself had that of gold and silver. When the s. c. therefore is wanting, the coin was certainly once plated. With Pertinax A. D. 192, there is a temporary cessation in the small brass; nor after him do any princes occur in that series till Valerian, A. D. 254, excepting Trajanus Decius A. D. 250, only. After Valerian, the series is continuous, and common. The brass coinage declined in size from the time of Severus, and Trajanus Decius in vain attempted to restore it; and Valerian and Gallienus were forced to issue denarii ærei of billon, and small assaria. The series of large and of middle brass are of two fixed and known sizes; the former about that of our crown, and the latter of our half-crown, till after Severus they gradually lessen. But the small brass takes in all the parts of the *As*, and every brass coin not larger than our shilling in size belongs to this series. Our limits will not allow our enumerating the coins of this series, but we refer to Pinkerton's *Ess.* vol. i. p. 272. &c. The series in small brass extends from the beginning to the close of the Roman empire, nay, far into the Byzantine, closing with Constantine Pogonatus, A. D. 670.

The silver imperial coins are very numerous and various. This series is as complete as any, and of far cheaper purchase, very few emperors being scarce in silver. Most types

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even of the large brass and gold are found in the silver, which thus unites the advantages of all metals. Sometimes the silver and gold coins, as being of one size, are struck from the same die, as the young Nero, reverse a votive shield *EQUEST. ORDO PRINC. JUVENT.* and others. One of the rarest silver coins is that of Gneius Pompey, son of the great Pompey, in Dr. Hunter's collection. It is supposed to have been struck in Spain, before the battle of Munda, soon after which he was slain.

The imperial gold forms a series of wonderful beauty and perfection; but it is only attainable by men of princely fortunes. In these the workmanship is carried to the greatest height; and the richness of the metal surpassed by that of the types. As gold refuses rust, the coins are generally in the same state as they came from the mint. The number of Roman gold imperial coins may amount to 5000; the silver to 10,000; and the brass to 30,000. The whole of the different ancient coins may amount to about 80,000; but the calculation cannot be very accurate.

Before we close this account of Roman medals, the *colonial* ought to be mentioned. As Roman colonies were settled in various parts of the empire, their coins have sometimes Greek, sometimes even Punic legends; though generally that on one side of such is Latin. But those with Latin legends only are far more numerous. Some of these coins are elegant, though most are rude and uninteresting. The colonial coins only occur in brass; those in first brass are very rare till the time of Severus. They begin with Julius and Antony. The Spanish colonial coins cease with Caligula, who took away this privilege from Spain. The colonial coins of Corinth are the most various and beautiful; presenting triumphal arches, temples, gates, statues, baths, and figures of gods and goddesses. Other remarkable colonial coins are of Emerita, of Illice, of Tarraco. The coins of Cassandria in Macedon are generally small brass, with the head of Jupiter Ammon on the reverse, and furnish that series with many fine heads of emperors, with Latin legends, from Claudius to Severus, but always with the same reverse. Many scarce portraits are found in colonial coins of that size; as the two Agrippinas, Agrippa, Cæsar, Drusus Cæsar, Octavia Neronis, Cæsonia, Messalina, and others. It is remarkable, that while Spain had perhaps 50 colonies, Camalodunum is the only one in Britain of which there are coins. There is one of Claudius, reverse a team of oxen, *COL. CAMALODON. AUG.* The smallest imperial silver alone are quinarii, the gold being semisses and trientes, and the brass at first small parts of the As, and latterly only the half assarion. These, instead of being denominated quinarii, might, more properly, be called "minimi;" as including the very smallest coins of all metals and denominations. The Roman coins have had a most extensive spread; some of them have been found in the Orkneys; and they have likewise been found in numbers in the most remote parts of Europe, Asia, and Africa, at that time discovered.

As for the medals of other ancient nations, besides Greece and Rome, some notice should be taken of them; premising that by *ancient* coins, all preceding the ninth century, or age of Charlemagne, are meant; and all posterior to that period are *modern*. No coins are found which can even be imagined to belong to Assyrian, Median, or Babylonian kings. The oldest coins found in their empire are palpably Persian and similar to the Greek. The Phœnicians do not appear to have coined money, till after the Greeks had set the example. No Phœnicians were ever found of much antiquity; and not one, without both obverse and reverse, nor are any of them older than about 400 years before our era. Weight alone was used in the famous cities of Tyre and

Sidon, as we learn from scripture; and in Egypt coinage was unknown, not a coin with a hieroglyphic being found; and in the mouths of the mummies there are only thin broad pieces of unstamped gold, to pay Charon's fare. India appears to have no claim to an early use of coinage. No Indian or Chinese coins exist till within a late period; and those of both countries are so rude as hardly to deserve being collected. Upon the whole the Lydian coins seem to be the most ancient in Asia. Next to these are the Persian, well known from the archer on them, and from Mithras the Persian deity, the dress of the princes and other marks. None of these coins can be older than 570 years before our era, when the Persian empire began. The famous darics were issued by Darius Hystaspes, who began to reign 518 or 521 years B.C. See *DARIC*.

Of Persian coins, there is a second series, that of the Sassanidæ, beginning about 210, when Artaxerxes overturned the Parthian monarchy. The Parthian coins have all Greek legends, but those later Persian bear only Persian characters: they are large and thin, with the king's bust on one side, and the altar of Mithras on the other, generally with a human figure on each side. The letters on Persian coins seem to partake of the ancient Greek, Gothic, and Alanic. The later Persian coins extend to the year 636, when Persia was conquered by the Arabian caliphs.

The Hebrew shekels are of silver, and originally didrachms, but, after the Maccabees, about the value of the Greek tetradrachm; and the brass coins, with the Samaritan characters, are most of them later than the Christian era, and generally the fabrications of modern Jews. F. Soucier has a dissertation on the Hebrew medals, commonly called Samaritan medals, in which he distinguishes between the genuine and the spurious: and shews, that they are true Hebrew coins, struck by the Jews, on the model of the ancients; and that they were current before the Babylonish captivity. The same impression of a sprig on one side, and a vase upon the other, runs through all the coins of this nation. The Phœnician coins are of Phœnicia, and the Punic of Carthage; and they are rendered interesting by the ancient civilization and great power of the Phœnicians and Carthaginians. The alphabets, which are nearly allied, have been illustrated by their relation to the Syriac, Chaldaic, and Hebrew. The same may be said of the Palmyrene coins and inscriptions. (See *PALMYRA*.) The Etruscan coins are inscribed with the Etruscan character, which is satisfactorily explained by its connection with the Pelasgic, or oldest Greek and Latin. The Spanish coins are inscribed with two or three different alphabets allied to the old Greek, or to the Punic. The ancient coins of Spain are numerous, and evidently not all struck by the Punic colonies, for the legends are in different characters. The ancient coins of Gaul are also numerous, and many of them in base gold, but unhappily the most ancient have no legends at all.

In speaking of the coins of Britain, Cæsar says of the natives, "they make use of brass instead of gold coin, or iron rings reduced to a certain weight instead of (our brass) coins." Mr. Pinkerton understands his meaning to be, that our ancestors used brass, apparently coined, as a superior metal, in like manner as more advanced nations used gold: and that *pro nummis*, instead of the brass coinage of Rome, (*nummus* being a peculiar name of the brass sesterlius,) they used iron rings, examined and reduced to a certain weight. Rude coins of copper, much mingled with tin, are frequently found in Eng^land, and may perhaps (as Pinkerton intimates) be the copper coins used by our ancients; for Cæsar's expression merely infers, that their copper was

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in the form of coins. These pieces are of the size of a didrachm, the common form of the "nummus aureus" among the ancients. We have many coins of Cunobelin, who was king of the Trinobantes, and educated, as it has been said, in the court of Augustus. He is mentioned by Suetonius and Dio. These coins of Cunobelin are the only ones apparently British. Most of them yet found have *CVNO* on one side, with an ear of wheat, a horse, a kind of head of Janus, or some such symbol, and often *CA MV*, thought to be the initials of Camulodanum, on the other side, with a boar and tree, and a variety of other badges. They have likewise frequently the word *TASCA* upon them, which has not yet been satisfactorily explained; but it has absurdly, as Mr. Pinkerton conceives, been thought to be the name of the Moneyer, as the putting of the name of the Moneyer on coins was a late practice, unknown till the sixth century, and gradually introduced a century after the Roman mints had ceased in Europe, with the empire, and when private persons contracted with the kings for the little mints, and put their names to identify the mintage. In old German *tasg* is a purse: and the figure thought to be the mock moneyer *Tasg* is Vulcan making a helmet. All the kings of France down to Charlemagne range in this division. Liuva I. who began his reign in the 567th year of our era, and the other kings of the West Goths in Spain, appear upon their coins encircled with Roman characters. Other Gothic kings, who reigned in Italy and other countries, after the fall of the Roman empire in the West, likewise use the Roman language in their coinage. They most commonly occur in the size of medals termed small brads. Many coins also occur with legends, which, though meant for Latin characters, and in imitation of Latin coins, are so perverted as to be illegible. Such are in general termed *Barbarous* medals. Pinkerton's *Ess.* vol. i.

MEDALS, Conservation of, is a matter among medallists of peculiar importance. When a medal is in the least defaced in figures, or in legend, the true judge will reject it, hardly excepting even the rarest coins. Nothing contributes so much to the conservation of brads or copper coins as that fine rust, sometimes called "æruge," appearing like varnish, which their lying in a particular soil occasions. Gold admits no rust but iron mold, when lying in a soil impregnated with iron. Silver takes many kinds; but chiefly green and red, which yield to vinegar. In gold and silver the rust is prejudicial, and ought to be removed; whereas in brads and copper it is preservative and ornamental; a circumstance remarked by the ancients, as the "pocula adorandæ rubiginis" of Juvenal may prove, and that exquisite Greek phrase, which terms "patina" $\chi\lambda\alpha\upsilon\alpha\sigma\iota\varsigma$, the flower of brads. "This fine rust," says Pinkerton, "which is indeed a natural varnish not imitable by any effort of human art, is sometimes a delicate blue, like that of a turquoise; sometimes of a bronze brown, equal to that observable in ancient statues of bronze, and so highly prized; and sometimes of an exquisite green, a little on the azure hue, which last is the most beautiful of all. It is also found of a fine purple, of olive, and of a cream colour, or pale yellow: which last is exquisite, and shews the impression to as much advantage, as paper of cream colour, used in all great foreign presses, does copper-plates and printing. The Neapolitan patina is of a light green; and when free from excrecence or blemish, is very beautiful. Sometimes the purple patina gleams through an upper coat of another colour, with as fine effect as a variegated silk or gem. In a few instances a rust of deeper green is found; and it is sometimes spotted with the red or bronze shade,

which gives it quite the appearance of the East Indian stone called blood-stone. These rusts are all, when the real product of time, as hard as the metal itself, and preserve it much better than any artificial varnish could have done; concealing at the same time not the most minute particle of the impression of the coin." Medals are subject to various blemishes. Sometimes the letters are displaced, as is commonly the case in those of Claudius Gothicus; sometimes the coins, for want of being well fixed in the dye, so as to have slipped at every stroke of the hammer, present a double or treble image. Of these last many are found, in which the portrait is deranged, while the reverse is distinct, and others have the portrait perfectly well struck, while the reverse confuses the eye by its double or triple contours. Ancient coins are subject to another blemish, which rather recommends them to the curious than otherwise. It is when, after having struck a coin, the workmen, through forgetfulness, put another into the dye, without withdrawing the first. Hence, the portrait of the other piece being commonly upward, and in the upper part of the dye, the second coin is impressed with it by the dye, and at the same time made hollow on the other side with the form of the portrait already stamped on the former medal. Some coins are found with a small stamp impressed on a part of them, bearing sometimes a minute head, or some letters, as *AVG.* or *N. P. NOV.* or the like. Such are called "countermarked" by medallists; and being very rare are the more valued, so that such must not be rejected or blemished. These countermarks are thought to infer, that an alteration had been made in the value of the coin; as was the case with the countermarked coins of Henry VIII. and of Mary of Scotland in modern times. Other coins are found with holes pierced through them; and sometimes with a small ring fastened. Such were worn as ornaments of the head, neck, and wrist; either by the ancients themselves, as bearing images of favourite deities, or in modern times, when the Greek girls thus decorate their persons. Coins of genuine antiquity are often found split on the edges, or even in the middle, by the force of the hammer. This, so far from being regarded as a fault, is looked upon as a great merit by the collector; being considered as a proof that the coin is undoubtedly of ancient fabric. Silver coins often acquire a particular yellow tarnish, giving them the appearance of having been gilt; but it is merely owing to their being deposited in a soil, whence a peculiar vapour arises, or some similar circumstance. Mr. Pinkerton has given the following hints concerning the method of clearing coins from any prejudicial rust. "Gold is cleaned by any acid: spirit of nitre eats every thing but gold, and is therefore an effectual cleanser of that metal. The green, blue, or red rust, may be removed from silver, by sleeping in vinegar for a day or two: but a more effectual way is to boil with a mixture of three parts tartar, and one sea-salt in water. On gold and silver the rust is always in spots, and never forms an entire incrustation, as on brads and copper; whence it is always regarded as a blemish in the former metals. Very different is the case with brads and copper, and they are never to be cleaned, for coins in these metals would be disesteemed if rendered bright, and would be full of small holes, occasioned by the rust. But sometimes brads and copper coins are found wholly obscured with rust; and one of the best ways of clearing them, if used by a skilful hand, is a graver. Another way is to boil in water for twenty-four hours, with three parts tartar, and one part alum, (not sea-salt as in silver,) and then cleanse with brao. But it is a dangerous business to cleanse coins; and ought always to be committed to a skilful hand, or let alone."

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See Joubert des Medial. sect. viii. Act. Erud. Lips. 1694, p. 226.

Some authors imagine, that the ancient medals were used for money. M. Patin has a chapter expressly to prove, that they had a fixed regular price in payments, not excepting even the medallions. F. Joubert is of the same opinion. Others, on the contrary, maintain, that we have no real money of the ancients; and that the medals we now have, never had any course as coins. Between these two extremes there is a medium, which appears by much more reasonable than either of them. See MONEY.

MEDALS and Coins, *Modern*, as contradistinguished from those that are denominated *ancient*, comprehend, as we have already observed, all those that have been struck since the time of Charlemagne, or the commencement of the 9th century. Mr. Pinkerton, of whose valuable "Essay on Medals" we have been allowed to avail ourselves in the compilation of this article, has divided the subject into "Modern Coins" and "Modern Medals." He observes, that down to the revival of literature in the beginning of the 16th century, modern coins are so very rude, that curiosity suggests the sole inducement to examine them. Without dates or epochs they cannot serve one purpose of utility. The very portraits found on them are so uncouth, that the human face divine is hardly discernible. The reverses always bear a most beautiful cross garnished with pellets, or a dish of some such exquisite flavour. Yet such is the lust of curiosity, of completing a series, or of self-love indulged in the extreme, by possessing a bauble which nobody else does, that ten or twenty guineas are often given for one of these pretty little things. To us, however, as Britons, the study of these coins may be regarded as peculiarly interesting, as they furnish monuments illustrating, or relating to, persons or actions, in the glory of which the common passion of national vanity warmly interests our affections. Thus, the noble of Edward III., on which he appears in a ship, as asserting the British dominion of the ocean, would, though uncouth in the execution, which it by no means is, justly command our highest regard and attention; and doubtless any patriot, or any Briton, would, even in these days, place most justly a higher value upon this coin, than upon the most perfect medal which Grecian skill has produced. Upon the same principle, the coins of Edward the Black Prince are interesting; and, indeed, the whole English series must be interesting to every one who feels himself particularly concerned in English history.

In this place modern coins are regarded merely as they appear in a cabinet; but for their commercial value, we refer to other articles, such as COIN, MONEY, &c. Beginning with the most eastern part of Asia, the coins of *Japan* first attract notice. These are thin plates of gold and silver, large and oval, stamped with little ornaments and characters. The only coins of *China* are in copper, about the size of a farthing, with a square hole through the middle, in order to their being strung for the convenience of enumeration or of carriage. They bear an inscription in Chinese characters, expressing the year of the prince's reign, without his name, distinguished as the "*Happy year*," "*The Illustrious year*," and the like. It is said, that Canghi, the emperor, who died in 1722, after a reign of 61 years, formed a complete cabinet of Chinese coins, and appointed a Mandarin to keep it. The coins of *Tartary*, which are posterior to Genghis-Khan, are rude, and generally present only inscriptions. In *Thibet*, *Pegu*, and *Siam*, the coins are various; but evidently of late origin, and generally bearing inscriptions on both sides. Such also are those of many smaller states in Eastern Asia.

In the country so celebrated anciently by the name of *India* the Mahometan faith is predominant, as it is in most countries of Western Asia. The precept of Mahomet, which forbids the representation of any living creature, has had a pernicious effect upon the arts. It is doubtful whether or not any Indian coins exist before the time of the Moguls, or the 13th century. Some old coins have been found near Calcutta, of gold, silver, copper, and tin, all mingled in one base mixed metal. On one side they bear a warrior with a sword, and on the other an Indian female idol. The later coins of India are well known, such as the pagoda, rupee, and cash, the most common copper, whence our word. All these coins are very thick, like the old Egyptian. On one remarkable set of rupees, are presented the twelve signs, a lion on one of them, a bull on another, &c. &c. The Portuguese, English, French, and Dutch, sometimes struck coins in their settlements with Persian inscriptions on one side and Latin on the other. Rupees and cash are known of Elizabeth, of Charles II., of the year 1730, and of other periods. The coins of *Persia* have continued on the Arabian model, even after the Arabian caliphs lost their dominion in that country, and bear on both sides pious inscriptions from the Koran. The Persian copper, however, has the sun and lion, the arms of Persia, on one side. Of Manlius, and some other petty kings in *Arabia*, we have coin during the imperial period of Rome. The brass coins of Haroun Al Raschid, the Charlemagne of Asia, and his contemporary, and of other powerful princes who resided at Bagdad, have an Arabic inscription on the reverse; the obverse is a mere transcript of any old Greek or Roman coin that fell in the way of the Moneyer. The gold and silver coins have many inscriptions. The later Arabian coins, which are silver, bear the name and titles of the prince on one side, and some sentence from the Koran, or the like, upon the other. The more modern are in the shape of a fish-hook, with Arabic inscriptions. The coins of *Turkey* resemble those of Persia and Arabia, having merely inscriptions on both sides. The coins of Africa, comprehending Morocco, Fez, Tripoli, Algiers, &c. are upon the Mahometan plan of mere inscriptions. Passing over Abyssinia, and the interior kingdoms of Africa, as little known, and the civilized empires of America, Mexico on the N., and Peru on the S., where coinage was not practised, we shall proceed to the coins of Europe. In *Italy*, when the Roman empire in the west ceased with Romulus, in the year 476, the Gothic kings struck coins till Teias, the last of them, was conquered in 552 by Narfes, the general of Justinian. Then the exarchs of Ravenna, viceroys for the Byzantine emperors, issued copper with FELIX RAVENNA, &c.; but the gold and silver of the Greek emperors sufficed for Italy. After Charlemagne, about the year 780, made a great revolution in Italy, there are coins of him struck in Rome and Milan. In the next century the modern coins of Italy begin with the silver pennies of various states. The papal coins originate with Hadrian I. 772—795, to whom Charlemagne gave leave to coin money. The silver pennies continued till a late period, with the name of the pope on the one side, and SCUS PETRUS on the other. On these coins there are rude portraits of some of the popes. Afterwards, when the pope ceased to have power in Rome, from Paschal II. till Benedict XI. in 1303, there are pennies of the Roman senate and people, bearing on one side Peter, ROMAN. PRINCIPE, on the other Paul, SENAT. POPUL. Q. R. In the middle ages the chief bishops of Italy, France, and England, struck coins, as well as the pope. The first gold coin is of John XXII. 1316. The coins of Alexander VI., Julius II., and Leo X. are remarkable for elegance.

elegance. The coins of *Milan* begin with Charlemagne, a cross, reverse the monogram of Carolus, with *MMML.*, and they are found of the other emperors to the 13th century. These coins are of silver. In *Naples* the coins of duke Sergius, 840, and bishop Athanasius, 880; and they are followed by those of several others. The coinage of *Pavia* begins in the 10th century, with silver pennies, marked *VN. N. E. C. I.* In 1280 the first Venetian gold appears; and the first copper in 1471. The silver groats are as old as 1109. *Florence* surpasses all the cities of Italy in the dignity of her coinage. Some silver pieces occur from the 12th century, or an earlier period; but in 1252, the famous gold coins, called Florins, from the flower of the lily upon them, appeared; and were imitated by the popes, France, and England, as being the first gold coins struck in Europe, after the eighth century, for during five centuries no gold worthy of notice was struck in Europe. The florins of Florence have on one side St. John the Baptist standing, s. JOHANNES. n. on the other a large fleur-de-lis, FLORENTIA; and the coins of the popes, France, and England resembling them, have the same types, but different legends. They weigh a drachm, and are no less than 24 carats fine, according to Italian writers; being intrinsically worth about 12s. The first coins of *Genoa* are of Conrad the emperor, 1120, DUX JANVÆ. Those of the dukes of *Saxony* begin in the same century. The patriarchs of *Aquilia* issued coins from 1204 till 1440. *Ferrara* has coins of marquises from 1340. In France, the coins of the first race from Clovis 490, till its termination in 751, are chiefly gold trientes, well wrought, with the heads of the kings. Some solidi and semisses also appear. These coins, which properly belong to the class of ancient coins, have on the obverse the king's head and name, but sometimes the name of the Monever; the reverse has a cross with the name of the town. The coins of the second race, beginning with Pepin in 750, and extending to Hugh Capet in 987, commence the modern class. These are no less barbarous than the others are elegant: they are almost all silver pennies, and very seldom bear the head of the king. Those of Charlemagne have only CAROLUS in the field, while the reverse bears n. f. or some such inscription. One piece alone, struck at Rome, has a rude bust of him. The third race, beginning with Hugh in 987, and extending to the revolution, are unfortunate in their coins, till the time of St Louis, in 1226, when the groat appears, and the coinage began to improve. The groat, or grosso, so called in comparison with the penny, passed from Italy to France, Germany, and England. In the time of St. Louis, deniers of billon were issued, and were followed by other pieces of the same metal, as the liard or hardi of three deniers, the maille or obole of half a denier, the pougeoise or pite of one quarter. In the time of Henry III. 1574, copper was first used in French coinage. Other remarkable coins of France are the blancs, or billon groats, first issued in 1348; the ecus a la couronne, or crown of gold, the most famous French coin, so called from the crown on one side, and begun by Charles IV. in 1384; the tesson, or piece with the king's head, of Louis XII.; the elegant Henri of Henry II. which has Gaul sitting in armour, with a victory in her hand, OPTIMO PRINCIPI; exergue GALLIA. The first Louis d'or is of 1640. *Spain* vies with France in the elegance of her early series, which consists almost wholly of trientes of gold finely executed. On one side they bear the head of the king, with his name, and on the other a cross with the name of the town. While the Moors, or Arabs, possessed Spain, from the eighth to the 13th century, and Granada in particular till the end of the 15th, such was the influence of the Mahometan faith, that the Moresque coins of Spain

only present us with insipid inscriptions on both sides: they are chiefly in gold; and the inscriptions are in the old Arabic character, used in Mahomet's time, called the Coptic. From Charlemagne the coinage of *Germany* commences; and the series of emperors is thought to be nearly complete. The coinage of *Denmark* begins with Canute the Great, in 1014. After Canute, we find coins of Harold and Hardicanute, then of Magnus Bonus in 1041, with Runic reverses and of most workmanship. But without enumerating those of Sueno II., which rarely have the bust, with an arched crown, and on the reverse curious ornaments of a tessellated form running across the field, with the mmm on either edge of the ornaments; and those of Harold I. in 1074, with generally two heads; the rude coins of Nicolas or Niel, of Waldemar I. and of his successors; those of Olaf in 1376, bearing a grinning full face, with a crowned O on the other side; and the billon coins of Eric in 1426:—we pass into *Sweden*, which is said to have begun her coinage under Biorno in 818, on the plan of that of Charlemagne; these coins have a cross, though Biorno was not a Christian; the next coins are of Olaf, OLUF REX SVEVORVM, &c. &c. the series proceeding till Margaret in 1387. From her time to that of Gustavus Vasa, in 1520, the coins are of Danish monarchs, struck for Sweden. Of Gustaf Wase, or Gustavus Vasa, and his successors, there are many fine coins. In 1634 ducats were coined with the bull of Gustaf Adolf, who died in 1632; reverse the arms of Sweden, with the chymic types of mercury and sulphur. In 1716, and the two following years, the small copper coins with Saturn, Jupiter, Mars, &c. were issued by Charles XII. to pass for dollars, on account of his want of money. The coins of *Norway* begin with Olaf, in 1066, and are followed by those of Magnus, Harold, &c. &c. Of Denmark, Sweden, and Norway there are also ecclesiastic coins, as of Germany, France, &c. struck by the chief bishops. *Bohemia*, the most westerly Slavonic kingdom, boasts the earliest coinage; the first coins are those of duke Boleslaus I. in 909, with his head and name. The coinage of *Poland* is nearly as ancient as that of Bohemia; and it may be observed in general, that the coinage of the Slavonic kingdoms follows the model of the German. The coins of *Russia* are of very late date. None of her coins seem to be more ancient than the 13th century. The first Russian coins have rude figures of animals on one side; and a man, standing, with a bow or spear, on the other. Some have St. George and the dragon, and various other types. Such are all kopeks, or silver pennies. The rouble or dollar, and its half, began under Ivan or John in 1547. Those of the false Demetrius, in 1605, are very scarce. In 1230, the knights of the Teutonic order, having conquered the Pagan inhabitants of *Prussia*, coined silver pennies on the German plan, at Culm. In the next century were struck shillings, groats, and schots, the last being the largest and very rare; they have the Prussian shield, an eagle surmounting a cross, within a rose-shaped border, MONETA DOMINORVM PRUSSIE; reverse a cross fleurie, within a like border, HONOR MAGISTRI JUSTITIAM DILIGIT. In the same century gold coins were struck. In 1525 the money was so debased, that 12 or 13 marks were worth but one mark of silver. The coins of Brandenburg and Poland are the later coins of Prussia.

We shall now proceed to give a brief enumeration of the coins of *Britain*. The Heptarchic coins are only of two sorts; the silver sceatta or penny, and the copper or billon styca, the latter being known only in Northumbria, and being a very small piece, worth about half a farthing. The silver penny may be regarded as the general heptarchic coin. The sceattas were struck in Kent, and the other states of the

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Heptarchy from the sixth to the eighth century, or from about the year 500 till 700. No heptarchic pennies occur till after the year 700; but sceattas, which Dr. Combe, by causing two plates of them to be engraved, has brought into notice, are found with the name of Ethelbert I., king of Kent, A. D. 560—616, and of Egbert, also king of Kent, A. D. 664. The heptarchic pennies are, therefore, almost all of the eighth century, or from 700 till 832, when Egbert terminated the seven kingdoms. The coins of the chief monarchs present almost a complete series, from Egbert 832 to Edgar 959. Of Ethelbald 857, and Edmund Ironside, A. D. 1016, there are no coins. Most of them bear rude portraits, and the reverses have views of cathedrals and other buildings, &c. The inscriptions are also sometimes curious. Ecclesiastic coins also appear of the archbishops of Canterbury, Wulfred, A. D. 804, Ceolnoth, 830, and Phlegmund, 889. The Norman conquest in 1066 made no alteration in the English penny, the only coin. The old English penny, or *anglicus*, Mr. Pinkerton observes, was a coin celebrated all over Europe in the middle ages, and almost the only money known in the northern kingdoms. In neatness of fabric, and in purity of metal, it is superior even to the Italian and French coins of that period. The series of English pennies extends almost without any failure from Egbert to the present reign. The kings wanting are John and Richard I. The Rev. Mr. Southgate, generally learned and peculiarly skilled in medals, has in his cabinet as neat and complete a series of this kind as is perhaps to be found. Several unlikes, or almost such, are found there in the best preservation; such as the French penny of Richard I., the penny of Richard III., the full-faced penny of Henry VIII. in fine silver, and others. The first English pennies weigh $22\frac{1}{2}$ grains troy: toward the close of Edward III. the penny weighs but 18 grains, and in the reign of Edward IV. it fell to 12. In Edward VI's time, 1551, the penny was reduced to eight grains, and after the 43d of Elizabeth to $7\frac{2}{3}$ grains, at which weight it continues to this day. The next coins in antiquity, pursuing the silver coinage, are the halfpennies and farthings, first struck by Edward I. about 1280, some having been previously issued in Ireland by John. The first were continued down to the commonwealth, since which time none have been struck in silver; the farthings ceased with Edward VI. To these succeeds the groat, from Fr. *gros*, a large piece, introduced by Edward III. in 1354. The half-groat, or two-pence, is of the same date. Next to the groat is the testoon, or shilling, first coined by Henry VII., in 1503. The appellation of testoon was derived from the teste, tête, or head of the king upon it. The shilling was at first a German appellation, *schelling*; coins of that name having been struck at Ham-burgh in 1407. The crown was published by Henry VIII. in silver, whereas it had before appeared only in gold; whence the old phrase "crowns of gold;" and the half-crown, six-pence, and three-pence, by Edward VI. Elizabeth, in 1558, coined three-halfpenny, and in 1561 three-farthing pieces, but they were dropped in 1582. From the 43d of Elizabeth, 1601, the denominations, weight, and fineness of English silver remain the same to the present time. It was about the year 1257 that Henry III. formed the design of a gold coinage, and ordered it to be current in the kingdom: however, no more than two specimens of it have reached us. It is called a gold penny, but larger than a silver one. But it is from Edward III. that the series of gold coinage commences, for no more occurs till 1344, when that prince first struck florens, so called from the best gold then coined at Florence. The floren was then worth 6s., but is now intrinsically worth 19, from the increased value

of gold, and diminution of silver coins. The half and quarter of the floren were struck at the same time, and of the same proportional value. In the same year the noble was announced, of 6s. 8d. value, and consequently forming half a mark, being then the most general ideal mode of money. This was attended by its half and quarter; the proportion of silver to gold being then 1 to 11. This coin, together with its subdivisions, continued the only gold coins till the angels of Edward IV. 1465, stamped with the angel Michael and the dragon, and the angelets, half the angel, or 3s. 4d. was substituted in their place. Henry VIII. in 1527, added to the gold denominations the crown and half-crown, at their present value; and, in the same year, gave sovereigns of 22s. 6d. and ryals of 11s. 3d., angels of 7s. 6d. and nobles at their old value of 6s. 8d. In 1546, the same sovereign, making the value of silver to gold as 1 to 5, struck sovereigns of the former value of 20s., and half-sovereigns in proportion. The gold crown of Henry VIII. is about the size of our shilling, and the half-crown of a sixpence, but thin, as all hammered money was in modern times. His gold coin, like his silver, is much debased. These coins continued, with a few variations, till Charles II. established the present sort of gold coin. Till Edward VI. our monarchs appear upon their gold coin at full, or three quarters, length; that prince being the first whose bust only is seen. Silver, which had been to gold for some time as 1 to 4, was again reduced in 1551 to its old proportion of 1 to 11. Upon the union of the crowns, James I. of England gave the sovereign the name of unite, it being then of 20s. value. Of him are likewise rose ryals of 30s. and spur ryals of 15s. angels of 10s. and angelets of 5s.; till his ninth year, when gold was raised in the proportion of 1s. in 10s. Silver, which had fallen in its proportion to gold from the degree of 1 to 12, now sunk further, as 1 to 13½ in weight. The gold crown and half-crown continued to this prince inclusive, and the crown to his successor. The sovereign, which had been commonly termed the broad-piece, under the commonwealth assumed the univindious name of the twenty-shilling piece, which it retained till it was supplanted by that of the guinea. The commonwealth likewise struck ten-shilling and five-shilling pieces in gold. Oliver published none but forty-shilling and twenty-shilling pieces, and very few even of these; the former in particular being mostly patterns. The guinea, so called from the Guinea-gold out of which it was first struck, was proclaimed in 1663, and to pass for 20s.; but it never went for less than 21s. by tacit and universal consent. It is only twenty-two carats fine, and two alloy, which is the standard of our gold coinage to this day. Charles II. likewise issued half-guineas, double-guineas, and five-guinea pieces, which have been all continued through every reign to the present time, though the latter two are not in common circulation. Geo. I. published quarter-guineas, an example imitated by his present majesty; but these last of George III. were found so troublesome and apt to be lost, that they were stopped within a year or two when received at the bank of England, and thus silently annihilated. Pieces of 7s. were likewise coined, and have been continued: they are known by the lion above the helmet. The last coinage is that of copper. The first money coined in ancient Britain seems to have been copper. But the Saxons never thought of coining except in the instance of the *lyca*. While copper coin continued to be wanting in the English authorized money till the year 1672, with a few small exceptions after the time of Elizabeth, we need not much wonder that in more remote periods its deficiency was not at all felt. The known averion of that queen,

queen, and of the nation in general, to a copper coinage, was owing to the counterfeit money called "black money," being always of copper mixed or washed with about a fifth part of silver. The term of "black money" evidently arose from contradistinction to "white money," which is yet a name for that pure silver which it was made to imitate. When it is considered, therefore, that the base money was always of copper, it is no wonder that the idea of a copper coinage should be confounded with that of an imposition of authorized bad money. In 1591, when the practice of coining tokens, upon the returning which to the issuer, current coin, or value was obtained, had got to a great length, government had serious thoughts of a copper coinage; and a small copper coin was struck, of about the size of a silver two-pence, with the queen's monogram on one side, and a rose on the other, the running legend being *THE PLEASOR OF A HALF-PENNY*. The queen, however, retaining her aversion to a copper coinage, the scheme proved abortive; nor was it revived till the succeeding reign, when, on the 19th of May 1613, king James's royal farthing tokens commenced by proclamation. They are mostly of the same size with the above, and have upon one side two sceptres in saltire, surmounted with a crown, and the harp upon the other. Their legend is the king's common titles running upon each side. These pieces, which were issued merely as pledges or tokens, for which government was obliged to give other coin if required, were not favourably received; but continued in a kind of reluctant circulation through this reign and the beginning of the next. In 1635 Charles I. struck those with the rose instead of the harp. But their currency was stopped by the number of counterfeits and the king's death in 1648; and then the tokens of towns and tradesmen again took their run, and increased prodigiously till 1672, when farthings, properly so called, were first published by government. After many trials for improving the copper coinage, and the issuing of many copper farthings, current half-pence and farthings first began in 1670 to be struck at the Tower; but they were not proclaimed till August 1672. These continued till the last year of Charles II., 1684, when disputes arising about the copper, tin farthings were coined with a stud of copper in the centre, and inscribed round the edge as the crown pieces, with *NUMMORUM FANULUS*, 1685 or 1686. Half-pence of the same kind were issued in 1685, and tin continued to be coined till the year 1692. But in 1693 the tin was called in, and the copper coinage commenced anew. All the farthings of the following reign of Anne are trial pieces, except that of 1714, her last year. They are beautifully executed; but the one whose reverse is Peace in a car, *PAX MISSA PER OREM*, is the most esteemed. It is observable with regard to the copper coinage, that the intrinsic worth of the metal is not one-half of its currency. The pound of copper, worth 10*d.*, yields 46 half-pence, or 23 pence, when coined. Hence forgeries even of good metal yield a large profit, and the whole kingdom swarms with counterfeit copper, inasmuch that not a fiftieth part of that currency is legitimate; an evil which requires remedy. Before we close this subject of the English coinage, we shall mention the Portcullis coins of Elizabeth, issued in rivalry of the Spanish king, for the service of the East India company, in their settlements abroad. They are of different sizes from the crown downward, and are easily distinguished by the portcullis on the reverse. To them succeeded the various siege pieces of Charles I. in gold and silver, some of the latter being so large as to be of 20*s.* value.

The coinage of Scotland did not commence till a late period. There is room to believe, says Mr. Pinkerton, that silver pennies exist of Alexander I., 1107, as some are found

with that name, apparently of ruder and more ancient fabric than those of Alexander II., 1214. Of David, 1124, there are coins. Those of William, 1165, are numerous, with *WILIAM*, or *WILIAM* III, or *III*; the last word used in Scandinavia for king, or perhaps a various spelling of the old French *Roi*. A large hoard of William's pennies was found near Inverness in 1780. The Scottish money continued to be the same with that of England in size and value till the time of David II., 1355, whose vast ransom drained the Scottish coin, and occasioned the size of that which remained to be diminished. After this ransom, the Scottish coin gradually diminished, in the first year of Robert III. it passed only for half its nominal value in England; and at length, in 1393, Richard II. ordered that it should pass only for the weight of the genuine metal in it. It sunk by degrees, till, in 1600, it was only a twelfth part value of English money of the same denomination, and so remained till the union of the kingdoms cancelled the Scottish coinage. In silver, we have only pennies of Alexander II., who reigned till 1249; but Alexander III., who reigned till 1293, coined half-pence. Of Robert I., 1306, and David II., there are silver farthings. The groat and half-groat, introduced by David II., completed the denominations of silver money till the reign of Mary, when they all ceased to be struck in silver. In 1544, the second year of Mary, Scottish money was a fourth of that of England. About the year 1553, shillings or tessoons were first coined, bearing the bust of the queen, and the arms of France and Scotland on the reverse: they were then worth 4*s.* Marks of 13*s.* 4*d.* Scottish were also struck, worth 3*s.* 4*d.* English. In 1565 the coin was to the English as 1 to 6; the silver crown being then first struck, weighing an ounce, and passing for 30*s.* Scottish; and lesser pieces of 20*s.* and 10*s.* were struck in proportion; and these have the marks upon them xxx, xx, x, to express their value. In the time of James VI., 1571, the mark and half-mark Scottish were struck, the former being worth about 22 pence and the latter 11 pence English. In 1578 the famous *NEMO ME IMPUNE LACESSET* occurs first upon the coin; the invention of which is ascribed to Buchanan. The Scottish silver, coined after the union of the crowns, it is hardly necessary to mention.

The gold coinage of Scotland resembled the English; Edward III. having given the first currency in this metal in 1344. About 30 years afterwards, Robert II. issued his. The gold coins of Scotland, however, are of much smaller model than the English. They were first called St. Andrews, from the figure of that tutelary saint upon his cross, who appears upon them, with the arms of Scotland, a lion in a shield, on the reverse. The lion was another name for the largest gold coin, from the Scottish arms upon it; next was the unicorn under James III.; and the chief gold pieces of James V. were the bonnet pieces, so called from the bonnet in which that king's head appears upon them. The last gold coinage of Scotland is the pistole and half-pistole, coined by William III. in 1701, worth 12*l.* and 6*l.* Scottish. They have the sun under the head.

The copper coinage of Scotland, though more current than that of England, is not of so early a date as some would ascribe to it. Buchanan speaks confidently of copper coinage in Scotland before James III.; but in this he is mistaken. During the reign of James III., says Pinkerton, the copper coinage began, and speedily increased in its pieces. The old Scottish coins of copper stood thus:

A Penny	=	$\frac{1}{2}$	of a penny English.
A Bodle	=	2	pennies.
A Hardie	=	3	pennies, the farthing English.
		P	A Plack

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A Plack = 4 pennies.

A Baw-bee = 6 pennies.

An Atkinson = 8 pennies.

N. B. The penny has a little dot behind the lion; the bodle, also called two-penny piece and turner, has two dots. This coinage continued the same through the reigns of Charles I. and II. The Scottish pennies of Charles II. are not very uncommon; they weigh only 10 grains. In Scotland there are no ecclesiastical coins; though they occur in Denmark, Norway, and almost all other kingdoms.

With respect to the coins of Ireland it may be observed, that, from their form and fabric, the old mace pennies found in this country were struck by the Danes there. Of Anlaf, 930, and Sihtric, 994, there are coins struck at Dublin, ON DYELL, or DYELL, Dufin or Dyflin being the real Danish original name of this fine city, as of towns in Scandinavia. Coins of Donald, an Irish monarch, probably Donald O'Neal, 956, are published by Simon. Other Danish and Irish kings have coins. The pennies struck by English monarchs in Ireland are remarkable: such, with the name of Dublin, occur of Ethelred, 866; Edred, 948; Edgar, 959; and one of Canute, 1017. The Irish coins from John to Henry V. are known by the triangle enclosing the king's head, and by the names of Irish towns on them: after Henry V. they are only distinguished by the names of Irish cities where they were struck. The harp is never seen upon Irish coin till the reign of Henry VIII. The difference between the Irish coin and the other money struck by the kings of England begins in the time of Henry VIII., who coined six-pences for Ireland, only worth four-pence in England. Mary issued base shillings and groats for Ireland; and Elizabeth's base money for Ireland is notorious. In 1601, copper pennies and half-pence were coined for Ireland by Elizabeth, though she would not consent to a copper coinage in England. In 1635 a mint was established in Dublin by Charles I.; but the massacre and disturbances in that country put a stop to it, and the plan was never resumed. After that massacre, 1641, the Papists struck what are called St. Patrick's half-pence and farthings, known by the legends FLOREAT REX, reverse ECCE GREX; and the farthing QUIESCAT PLEBS. In Cromwell's time, copper tokens were struck by towns and tradesmen, as in England. In 1680, half-pence and farthings were given by authority, with the harp and date. James II., arriving in Ireland from France in 1689, instituted a mint, and issued shillings and half-crowns, struck of all the refuse metal which could be procured: for this purpose some brass guns were used, so that the coinage is generally called gun-money. Pennies and half-pennies of lead mixed with tin were published in 1690; and other crowns of gun-metal, of the size of half-crowns, without the mark of the month, in the same year. The crowns of white metal, which are very scarce, have James on horseback, with titles no longer his; and on the reverse the arms, CHRISTO VICTORE TRIUMPHO, with this legend on the rim, MELIORIS TESSERA FATI ANNO REGNI SEXTO. The patent of William Wood, esq., acquired from George I., for coining half-pence and farthings, occasioned great discontent, on account of the great loss that attended it. These coins are of very fine copper and workmanship, and have the best portrait of George I., perhaps, any where to be found. Sir Isaac Newton, then at the head of the mint, said they were superior to the English in every thing but size. In 1737, both of George II., Irish half-pence and farthings were again coined of just size and weight, with the harp only on the reverse; and the like are continued to this day. As they have no mint in Ireland, they are all coined here, and sent to that kingdom. In

1760 the scarcity of copper coin in Ireland was relieved by a society of Irish gentlemen, who obtained leave to coin half-pence; which appeared with a very bad portrait of George II., and VOCE POPULI round it. Since the abolition of the mint erected by Charles I., which happened about 1640, no gold or silver coins have been struck with the Irish badge, but copper only. See COIN, COINAGE, and MONEY.

Modern Medals.—In the middle ages medals were quite unknown. Till the 15th century no medals appear of any country in Europe, if we except Scotland, which can boast of gold medals of David II. 1330—1370, struck in England during his captivity. In the next century medals appeared in Italy, and from that time successively in most countries of Europe. The gold medal of the council of Florence, 1439, is one of the earliest of these medals. Some indeed have mentioned, that of the famous reformer, John Hufs, in 1415, as the first. Vittore Pisano, a painter of Verona, is celebrated as perhaps the chief restorer of this branch of art. His medals, however, have no similarity to those of antiquity, being very large, and all cast: they were first modelled in wax, then a mould was taken from the model in fine sand and other ingredients. When a good cast was procured, it was touched up, and made a model for the rest. Vasari, in his lives of the painters, gives us a catalogue of the medals done by Pisano. The papal medals are not only the most elegant, but the most ancient series in modern Europe. Paul II., created pope in 1464, is the first pontiff who has medals of his own time. After Paul II., coeval medals are found of all the popes. In the time of Alexander VI., 1492—15 3, the elegance of the papal medals begins to dawn; but his successors Julius II., Leo X., Hadrian VI., and Clement VII. were singularly fortunate in having many of their medals designed by Raffaele, Julio Romano, and other great painters; and executed with corresponding workmanship. The medal of Julius II., with Saul, CONTRA STIMULUM NE CALCITRES, is the first medal, according to Venuti, that was struck, not cast. The medal of Julius III., reverse a Ganymede ΦΕΡΝΗ ΖΗΝΟΣ ΕΥΦΑΙΝΕΙ, the dower of Jove delights, the design of which is ascribed to Michael Angelo, is denied to be genuine by the pontifical writers. But there is a fine medal, designed by Parmegiano, of Gregory XIII., upon the correction of the calendar; reverse a serpent, with his tail in his mouth, and a ram's head for the sign Aries, in the centre, ANNO RESTITUTO, M.D. LXXXII. marked I. PARM. beneath the pope's bust, in the obverse. Besides the papal medals, there are many of the various states in Italy. Next to Italy, France is the most remarkable country for medals. But the French medals are neither fine nor numerous, till the reign of Louis XIV., who has exceeded all modern princes in this way. In Denmark, there are medals of Christian II. 1516, and of Frederic and Sophia, 1532. Of Frederic II. and Christian IV. there are many medals. The elephant of the house of Oidenburg is very frequent on Danish medals. In Sweden there are many fine medals of Gustaf Vasa, or Gustavus Vasa. Christina appears on several, struck chiefly at Rome after her abdication. Of Charles XII., there are several curious medals. The medallic history of Holland begins in the year 1566. In the Spectator a Dutch medal is quoted as English; namely, that on the defeat of the Spanish armada, a fleet, FLAVIT ET DISSIPATI SUNT, 1588. Many Dutch medals are remarkable for maps and plans. The Spanish medals begin, as Mr. Pinkerton suggests, with Consalvo, the great captain, in 1503; and many of them are curious and interesting. Germany and Spain were as one empire under Charles V., of whom there are many medals.

But

But the German ones begin with Frederic III., of whom there is one struck at Rome 1453; next is Maximilian 1534, who appears in the honour, worn before hats were invented about 1565, and a wheel on the reverse, *PER ROTAM CRISTINA*. There is a curious medal upon the death of Louis, king of Hungary, at Mohatz, 1576, when he fell fighting against the Turks; observe his head, and that of his queen, face to face; reverse a battle. The medals of John of Leyden, leader of the Anabaptists, 1534, 1535, are singular monuments of folly and fanaticism. They bear his bust, with German inscriptions and legends. Amongst other curious medals, there is one of Sebastian, King of Portugal, famous for his unfortunate expedition in Africa, 1575, with his bust, full face, and three quarters length, *SEBASTIANUS D. G. REX PORTUGALIE, ARABIE, INDIE, ET AFRICÆ ANNO ÆTATIS XVI.*, reverse a shell-fish in the sea, the moon and seven stars, *SERENA CELSA FAVENT*. There is another singular medal of Catherine of Medici, queen of France, notoriously addicted to astrology. It represents her naked, between Aries and Taurus, with the name *NULLA ASMODEA*, over her head: she holds a dart in one hand, and a heart in the other: in the exergue is *OXIUS*.

As soon as medals began to revive, they became satiric; a quality almost unknown to the ancient mint. Medals among the moderns have been the chief article of satire, till the printshops took up the trade. The first satiric medal, it is believed, was struck by Frederic, king of Sicily, in 1501, against his enemy, Ferdinand, king of Spain. It bears the head of Ferdinand, *FERDINANDUS R. AR. VETUS VULPES ORNIS*; reverse a wolf carrying off a sheep, *JUGUM MEUM SUAVE EST ET ONUS MEUM LEVE*. It is said that in 1588, Elizabeth, queen of England, struck a medal, with the Spanish and English fleets, *HESPERIDUM REGEM DEVICTA VIRGO*. Philip, king of Spain, caused medals of the same impression to be distributed in England; but with this addition, *NEGATUR, EST MERETRIX VULGI*. The queen suppressed them, and published another medal, with this legend,

“ Hesperidam regem devicit virgo Negatur,
Est meretrix vulgi, Res eo deterior.”

Above all nations, the Dutch have most distinguished themselves for satiric medals; and have paid dearly for this kind of presumption. A great number of medals have been struck for private men of eminent learning or talents, and in this respect modern medals are superior to the ancient.

Mr. Pinkerton closes his account of modern medals with a comparison between these and the ancient medals. The most surprising difference between the ancient and modern works of art lies in the portraits. The ancient artists, even of the lowest class, marked the character, and exhibited the life and spirit of the person whom they represent; while the moderns only produce a kind of model, with very faint features of the character. The ornaments of the portraits have also this effect; the ancient being simple and picturesque in real life; whereas ours are discordant and ungraceful. The reverses of ancient medals, when consisting of human figures, or detached objects, exceed the modern in every view of strength, elegance, or taste. But in landscape, and all that belongs to perspective, the modern excel the ancient to a prodigious degree. A great fault of modern reverses, as of modern portraits, is that the manners of the time and country are very often totally perverted in them. Personifications are of all ages and countries and languages; but what title have heathen gods or goddesses to exist on our medals, and attract the adoration of our connoisseurs? Mr. Pinkerton, taking advantage of Dr. Coningham's tract on modern me-

dals, makes some remark on the legends. But for the different kinds of legends that are contained, we refer to the article *LEGENDS*, to which the reader is desired to consult the end of the present volume of Coningham.

The first English medals are the duke of Devonshire's coronet. It is in gold, of a large size, upon the plan of the early Italian medals, being one without doubt in Italy, and bears on one side a shield 10. *RICARDUS REX ANGLIÆ ET FRANCIE, 1381*, reverse the arms of Richard I. *RICARDUS REX ANGLIÆ ET FRANCIE, 1198*. The next English medal is that of Henry VIII. struck in 1545; it is of gold, larger than a crown-piece, and has the king's head full-face on the obverse, with three legends within each other, of his initials and other matter. The reverse contains two inscriptions, declarative of his being head of the church, &c. the first in Hebrew, the other in Greek. This was imitated in all points by his successor Edward VI. in his coronation medal, being the full we have. Elizabeth presents us with a good number of medals, one or two of which are tolerable, but the rest very poor, inferior to those of Philip and Mary, two of whom in silver by Trezzo are of high relief, and good execution. Decent medals appear of James I. and his queen; and a very large one of Charles I. and Henrietta, in 1636, deserves notice for its fine workmanship. The reverse represents Justice and Peace, kissing, awkwardly enough; but the execution of the king's bust, and that of his lovely queen, is very masterly. The medals of Charles I., who was a lover of the arts, are various and curious; but we cannot enlarge in the enumeration of them. The commonwealth and Oliver Cromwell, were singularly fortunate in having the celebrated Simon for their artist in this line. The medals and coins of Simon are deservedly regarded as the most admirable which modern times have produced. Of Charles II. there are several good medals, as on his leaving Holland, his restoration, and coronation. The short reign of James II. has several medals, the most remarkable of which are the *NEMO ME IMPUNE LACESSET*; that with his queen, *FORTES RADII SED BENIGNI*; those on the Pretender's birth, *FELICITAS PUBLICA*. William III. gave occasion for many interesting medals. Those after his accession to the English crown, have generally his head and Mary's joined, as the *MAJUS PAR NOBILE*; *ATAVUM PRO LIBERTATE*; *NEC LEX EST JUSTIOR VLLA*; *NISI TU QUIS TEMPERET IGNES*; and others. Many medals also occur of James II., after his abdication, and of the other pretenders, done in foreign countries by eminent artists. Queen Anne has several fine gold, silver, and copper medals; of the first only two or three different pieces were struck; but in the other medals of this princeps, we have a series of all the great events with which Marlborough illuminated her reign. About 1740, and for some years before and after, Daffier, a native of Geneva, settling in London, engraved a series of medals of all the English kings, with great taste and spirit. They are struck upon fine copper, and amount to thirty-six in number. He likewise gave medals of many illustrious men of this and other nations, which, says Pinkerton, deserve considerable praise. The various medals of eminent private persons in England are very numerous. Those who wish for fuller information of English medals than our limits allow, and the preceding extracts furnish, may consult Pinkerton's Essay so often cited, and Mr. Snelling's plates of them.

Of medals of Scotland, which are numerous, we can only mention some of the principal. The fine gold pieces of David II. 1330—1370, which we have already noticed, are certainly medals. Another Scottish medal occurs of James III. 1478; it is of gold, weighing near two ounces, and its diameter is $2\frac{1}{2}$ inches. The obverse bears a beard-

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els king, with long hair, sitting on a throne, holding in one hand a naked sword, in the other a shield with the Scottish arms. On the borders of the canopy, above the throne, is a Gothic inscription, IN MI DEFFEN, in my defence: the legend of the obverse in Gothic letters is, MONETA NOVA IACOBI TERTII DEI GRATIA REGIS SCOTIÆ. The reverse bears St. Andrew and his cross, SALVVM FAC POPVLVM TVVM DOMINE. Another remarkable Scottish medal is that inaugurative of Francis II. of France and Mary of Scotland, struck upon their coronation as sovereigns of France, and presenting busts of them face to face, with three legends, the outermost of which contains their titles, and the middle one this singular sentence, HORA NONA DOMINUS IHS EXPIRAVIT HELLI CLAMANS: the innermost legend is the name of the city of Paris. The fine crown of Mary and Henry, 1565, is so rare as to be esteemed a medal of the highest value; it is supposed to be worth 40 or 50 guineas. Henry and Mary appear on it face to face, with their titles, and the reverse bears the arms of Scotland, with this legend, QVOS DEVS CONIUNXIT HOMO NON SEPARET. Another remarkable medal of Mary gives her portrait full-faced, and weeping, O GOD GRANT PATIENCE IN THAT I SUFFER VRANG. The reverse has this inscription in the centre, QVIVO CAN COMPARE WITH ME IN GREIF—I DIE AND DAR NOCHT SEIK RELEIF; and this legend around, HOVRT NOT THE (figure of a heart) QVHAIS IOY THOV ART. The last Scottish medal, which we shall mention, is the celebrated coronation medal of Charles I., when he underwent his inauguration at Edinburgh, 18th June, 1633. It was executed by Briot, an eminent French artist; and was the first piece struck in Britain with a legend on the edge, being, it is supposed, the only one ever coined of gold found in Scotland. On the front is the king's bust, crowned and robed, with his titles. The reverse bears a thistle growing, HINC NOSTRÆ CREVERE ROSÆ. Around the edge is EX AVRO VT IN SCOTIA REPERITVR BRIOT FECIT EDINBVRGI, 1633. Few of these were struck on the Scottish gold, three only being known to exist, of which one is in the museum. The piece is not uncommon in silver, in which metal it wants the legend on the edge, which constitutes its chief curiosity and merit. It was in rivalry to this that Simon gave his fine medal of Oliver, the reverse of which is an olive tree, NON DEFICIENT OLIVÆ.

MEDALS, History of, and Account of Writers on this Subject. The study of medals affords such a variety of amusement and of instruction, that we may naturally suppose it to be almost as ancient as medals themselves; and yet ancient writers do not furnish us with a single hint of collections of this kind. In the days of Greece, a collection of such coins as then existed would not be regarded as an acquisition of any great value, because it must have consisted only of those that were struck by the innumerable little states, which then used the Greek characters and language, and of course it would be regarded as a sort of domestic coinage, precluded from extension by the narrow limits of the intercourse that subsisted between different provinces and countries. As soon as any communication was opened between the Romans and the Greeks, the Grecian coins were imitated by the Roman workmen, and preserved in the cabinets of their senators among the choicest treasures. In a more advanced period of the Roman empire, individuals must have formed serieses of Roman coins: for we find, in fact, that a complete series of silver was lately found in our island, containing, inclusively, all the emperors down to Carausius. From the decline of the Roman empire, most branches of science were enveloped in great darkness, till the revival of litera-

ture towards the end of the 15th century. When literature began to be cultivated in Italy, the study of medals, connected with that of ancient erudition, began to engage attention. Accordingly Petrarch, who in modern times was amongst the first persons in Europe that aspired to the celebrity of learning and of genius, was likewise the first to constitute an example of the science of medals. This eminent writer, being desired by the emperor Charles V. to compose a book that should contain the coins of illustrious men, and to place him in the list, with a noble pride answered, that he would comply with his desire, whenever the emperor's future life and actions deserved it. Availing himself of this circumstance, he sent that monarch a collection of gold and silver coins of celebrated men. "Behold," says he to the emperor, "to what men you have succeeded! Behold whom you should imitate and admire! To whose very form and image you should compose your talents! The invaluable present I should have given to nobody but you; it was due to you alone. I can only know or describe the deeds of these great men. Your supreme office enables you to imitate them."

In the next age Alphonso, king of Arragon, caused all the ancient coins, that could be discovered throughout all the provinces of Italy, to be collected, which he placed in an ivory cabinet and always carried with him; that he might be excited to great actions by the presence, as it were, of so many illustrious men in their images. Anthony, cardinal of St. Mark, nephew of Eugene IV., who ascended the pontifical chair in 1431, had a vast collection. Soon afterwards Cosmo de Medici began the grand museum of the family of the Medici at Florence; the most ancient, as well as the most noble, in the universe. Among a profusion of other monuments of ancient art, coins and medals were not neglected. About the same period Matthias Corvinus, king of Hungary, formed a noble collection of coins, along with ancient MSS. and other valuable reliques of antiquity. The first person who seems to have examined medals, and adduced them as vouchers of ancient orthography and customs, was Agnolo Poliziano, or Angelus Politianus. Maximilian I., emperor of Germany, formed a cabinet of medals, by means of which Joannes Huttichius was enabled to publish a book of the lives of the emperors, enriched with their portraits, delineated from ancient coins. M. Grollier, treasurer of the armies of France in Italy during part of the 16th century, had a great collection of coins in all metals. When, after the death of Grollier, these were about to be sent into Italy, the king of France bought them at a high price for his own cabinet of antiquities. Besides medals of brass, this collection contained an assortment of gold and silver. Guillaume du Choul, a contemporary of Grollier, had also a good collection of medals, many of which were published in his treatise on the religion of the ancient Romans, printed at Lyons in 1557. From the letters of Erasmus we learn that the study of medals was begun, in the Low Countries, about the beginning of the 16th century. About the middle of that century, Goltzius, a printer and engraver, travelled over a great part of Europe in search of coins and medals, for works relating to them, which he proposed to publish. At this time, as he informs us, there were in the Low Countries 200 cabinets of medals, 175 in Germany, more than 380 in Italy, and about 200 in France: to which we may add about 500 for our own country, which Goltzius did not visit. The greater number, however, of these cabinets were of that class called caskets of medals, including from 100 to 1000, or 2000 in number. If we except Italy, there are few countries, in which more ancient coins are found

found, than in Britain. Mr. Pinkerton suspects, that Camden was one of the first, if not the very first, of our writers, who produced medals in his works, and who must have had a small collection. In the 17th century, Speed's Chronicle, published in 1610, was illustrated with coins from Sir Robert Cotton's cabinet. Henry, prince of Wales, bought the collection of Gorlaun, amounting, as Joseph Scaliger says, to 30,000 coins and medals, and left it to his brother, Charles I. Archbishop Laud bought 5500 coins for 600*l.* and gave them to the Bodleian library. Thomas, earl of Arundel and Surry, earl marshal of England, had, in his exuberant collection of antiquities, a rich cabinet of medals, gathered by Daniel Nilfum. The dukes of Buckingham and Hamilton, Sir William Paillon, Sir Thomas Fanshawe, Sir Thomas Hammer, Ralph Sheldon, Esq. Mr. Selden, and many more, are enumerated by Mr. Evelyn, as having collections. To this number we may add the earl of Clarendon, the historian, and Charles I. The fine cabinet of this unhappy monarch was dissipated and lost in the civil commotions. Oliver Cromwell had also a small collection; and that of Charles II. is mentioned by Vaillant. We may add, that his present majesty possesses a tolerable collection of ancient gold coins. Since the time of Mr. Evelyn, many noble cabinets have been formed in this country, which we cannot recount. At present, the chief cabinets in Britain are those of the duke of Devonshire, the earl of Pembroke, earl Fitzwilliam, formerly the marquis of Rockingham's, the Hon. Horace Walpole, the Rev. Mr. Crachode, the Rev. Mr. Southgate, Mr. Townley, Mr. R. P. Knight, Mr. Edward Knight, Mr. Tyson, Mr. Barker, Mr. Brown, Mr. Bootle, Mr. Hodful, Mr. Aulien; with Mr. Ord's Egyptian, Mr. Douce's small brads, and Mr. Jackson's British.

The museum, lately enriched by some of those above-mentioned, and the universities, have also collections; and also the Lawyer's library, and one or two colleges in Scotland; to which might be added private collections both there and in Ireland. But that of the late Dr. Hunter deserves notice, as the greatest in Europe, if we only except that of the late French king. From the middle of the 17th century down to these times, almost every year has produced some new work, or new discovery, in the science of medals.

Of writers in this department of science, Mr. Pinkerton has enabled us to mention the following: in Italy, Enea Vico published, in 1548 or 1555, his "Discourses on the Medals of the Ancients." His example was imitated in France by Antoine le Pois, who in 1579 gave his "Discourse on the Coins and Seals of the Ancients." In 1665, Charles Patin published his "History of Medals, or Introduction to that Science." The last edition appeared in 1695. In 1692, Pere Jobert, or Joubert, presented to the public his "Science des Medailles," the best edition of which is that of 1739, by M. le Baron Bimard de la Baillie. In the year in which Jobert published his book, a work somewhat similar to it was published in the English language, entitled "The Greek and Roman History illustrated by Coins and Medals, representing their Religion, Rites, &c. by O. W. (Obadiah Walker,) London 1692, 12mo." In 1695, a translation of Jobert's work appeared under the title of "The Knowledge of Medals," ascribed to Walker. The "Numismata, or Discourse on Medals, ancient and modern," by Mr. Evelyn, was printed in 1697, fol. In 1720, Nicolas Haym, an Italian musician, published at London his "Tesoro Britannico," or British Treasury, in Italian and English. They who wish to proceed in this science, says Mr. Pinkerton, may peruse the most excellent and useful work of Froelich, entitled "Notitia Numismatum antiquorum illorum, quæ

Urbium Libensium, Regum et Principum, ac Personarum illustrium, appellantur," Vienna, Prægæ, et Terræ, 1758, 4to; and afterward such books of medals as they please, in chronological order as published, from Goltzius down to Pellerin and Combe. The following list of the best authors is given by Mr. Pinkerton. For the general science he recommends Vico's work, and Patin's already mentioned. The study of the Greek coins may be begun with Goltzius "Hiberna Sicilicæ et Magnæ Græciæ ex antiqui Numismatibus," Antwerpæ 1644, fol. Recourse may then be had to Goltzius's "Thesaurus Numismatum," Tiguri 1738, two vols. fol. The productions of Pellerin, Paris 1762, and following years till 1778, making, with all the supplements, 10 vols. 4to, ought next to be perused. Dr. Combe's publication of Dr. Hunter's coins of Greek cities, London, 1782, 4to., as it is the last, so it is the very best of the kind ever yet given. Of the Greek monarchic coins Gessner's is the most ample assemblage. The Roman consular coins will also be found in full detail in Gessner; and descriptions may be found in Vaillant's "Nummi Antiqui Familiarum Romanorum," Amst. 1703, two vols. fol., or the "Thesaurus Morellianus," Amst. 1734, two vols. fol., a later and a better work. The imperial coins of Rome are likewise amply displayed by Gessner; with whom, for the rare coins, should be read Vaillant's "Numismata Imperatorum Romanorum," published by Baldini at Rome, 1743, three vols. 4to., and Khehl's "Numismata Imperatorum Romanorum," Vindobonæ 1767, 4to., a supplement to the Roman edition of Vaillant; Banduri's "Numismata Imp. Rom. a Trajano Decio usque ad Palaeologos," (or to the termination of the Byzantine empire) Lutetiae, 1718, two vols. fol.; Occo's "Numismata Imp. Rom." The best edition is the second of Occo himself.

Of books on modern coins and medals, the first which ought to be perused by a British subject are those relating to his own country. He should begin with Mr. Clarke's "Connection of the Roman, Saxon, and English Coins," London 1767, 4to.; Mr. Lowndes's excellent "Report, containing an Essay for the Amendment of Silver Coins," Lond. 1695, 8vo.; Snelling's "Views of English Money," Lond. 1763, and following years, 4to.; and Folkes's "Tables of English Coin," Lond. 1763, 4to. Ducarel's "Letters on Anglo-Gallic Coins" are very considerable. English medals are published by Snelling and in Vertue's Account of Simon's works. On the Scottish coins the only books are those of Anderfon and Snelling. The Irish are well displayed by Simon, in his "Historical Essay on Irish Coin," Dublin, 1749, 4to., with the supplement by another author 1767, 4to. For the account of the sources of information with regard to other modern countries, we must refer to Mr. Pinkerton's preface. The second edition of Mr. Pinkerton's "Essay on Medals" will supersede the necessity of constant reference to other works, not easily procured; and the reader will find, that the author has cited original authors, and availed himself of an examination of many of the coins themselves, which he has described. This elaborate work, in two small volumes, Lond. 1789, will afford to the student in this branch of science ample satisfaction. This edition, besides many corrections and additions, that very much contribute to the increased value of the work, is illustrated with prints of coins, engraven exactly of the form and size of the originals, forming specimens of all the principal sorts. In the advertisement to this new edition, the author expresses himself in terms of high commendation concerning Monaldini's "Istituzione antiquariou Numismatica," printed at Rome, 1772, 8vo., which, he says, is much superior to Jobert's "La Science des Medailles."

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MEDALS, Utility of the Study of. Medals are of great importance to the study of history. They, indeed, furnish the principal proof of historic truth, as their evidence reaches to the most remote ages and the most remote countries. Vaillant set the first example, in his learned history of the Syrian kings, printed at Paris in 1681, of fixing the dates, and arranging the order of events in ancient historians, by means of these infallible vouchers. Thus he was enabled to ascertain, in a very great degree, the chronology and progress of events of three of the most important kingdoms of the ancient world, *viz.* those of Egypt, of Syria, and of Parthia. Father Hardouin, Noris, and Bayer, have pursued the same plan; and to them we may add Froelich, Corfini, and Cary. The study of the Roman medals has a superior advantage to that of the Greek coins, as they serve not only to illustrate the chronology of reigns, but to aid us in the interpretation of particular events. To this purpose, besides the portrait of the prince, and date of his consulship, or of his tribunitian power, we have a representation, or poetical symbol, of some grand event on the reverse. In a word, the series of Roman coins presents the very best suite of documents of the Roman history, which the art of man could have invented. Besides its service to history, the science of medals is without doubt of considerable use to geography, to natural history, to the illustration of ancient writers, to architecture, and to the knowledge of a connoisseur, or that of ancient monuments, busts, statues, ceremonies, and the like; in all which views its utility is well illustrated by examples in Pinkerton's valuable work. He has also evinced the connection of the study of medals with the fine arts of poetry, painting, sculpture, and architecture. In the first respects, he has greatly improved upon Mr. Addison's "Dialogues on the Usefulness of ancient Medals." On this very interesting subject, which Mr. Pinkerton has rendered no less amusing than instructive, we cannot forbear making a few extracts. The Roman coins to a man of poetical imagination are very entertaining by means of the fine personifications and symbols, which are to be found on their reverse. *Happiness* has sometimes the caduceus or wand of Mercury, which Cicero tells us was thought to procure the gratification of every wish. In a gold coin of Severus, she has heads of poppy, to express that our prime bliss lies in oblivion of misfortune. *Hope* represented as a sprightly damsel, walking quickly and looking straight forward. With her left hand she holds up her garments, that they may not hinder the rapidity of her pace; while, in her right hand, she holds forth the bud of a flower, an emblem infinitely more fine than the trite one of an anchor, which is the symbol of Patience, not of Hope. *Abundance* is imaged as a sedate matron, with a cornucopia in her hands, of which she scatters the fruits over the ground; but does not hold up her cornucopia, and keep its contents to herself, as many poets and painters make her do. *Security* stands leaning on a pillar, indicative of her being free from all designs and pursuits; and the posture itself corresponds to her name. The emblems of *Piety*, *Modesty*, and the like, are equally apposite and poetical. The happiness of the state is pictured by a ship, sailing before a prosperous breeze; an image of which Gray has admirably availed himself in his "Bird." The different countries of the then known world are also delineated with great poetical imagery. To a Briton, it affords peculiar satisfaction to see his native island often represented upon the earliest imperial coins, sitting on a globe, with a symbol of military power, the "labarum," in her hand, and the ocean rolling under her feet. Coins also present us with countries and rivers, admirably personified. On the reverse of a colonial coin, rude in execution, of

Augustus and Agrippa, inscribed IMP. and DIVI. F., the conquest of Egypt is represented by the apposite metaphor of the crocodile, an animal almost peculiar to that country, and at that period esteemed altogether so, which is chained to a palm-tree, at once a native of the country and symbolic of victory. Moreover, a cabinet of medals, of which Rubens is said to have had a very fine collection, may be considered as forming the classic erudition of a painter. We may add, that almost all the uses which connect the science of medals with painting, render it also subservient to the art of the sculptor, who cannot less than profit by the study of the Greek coins in particular. The connection of the study of ancient coins with architecture, consists in the views of many of the ancient edifices, which are found in perfect preservation on medals. Froelich observes, that the coins of Tarsus are very remarkable for a kind of perspective in the figures. On others are found triumphal arches, temples, fountains, aqueducts, amphitheatres, circuses, hippodromes, palaces, basilicas, columns and obelisks, baths, sea-ports, pharos, and the like.

MEDALS and Coins, Rarity of. The scarcity of coins, bearing any particular impression, must be principally owing to the few that were struck with that impression, or their being called in, and issued from the mint in another form. The first is the case with the copper of Otho, and gold of Pescennius Niger; the latter with the coinage of Caligula. Sometimes coins, formerly esteemed almost singular, will, in later times, become much more common in consequence of the high price at which they are rated, so that they are brought to market as hoards of them are found. The first was the case with the farthings of queen Anne; some of which, formerly sold at five guineas, would not now fetch five shillings; the latter with respect to the coins of Canute, king of England, which were very rare till a large hoard of them was discovered in the Orkneys. The coins of Greek cities are esteemed to be more common in copper than in silver; double the number existing in the first metal: those of Greek princes the reverse, with a few exceptions, those of silver being more numerous. Of the Greek monarchic coins, the tetradrachms of the Syrian kings, the Ptolemies, the princes of Bithynia and Macedon, excepting Alexander the Great and Lysimachus, are all rare. Those of Cappadocian kings are not found, except of small size, and are scarce. Of the kings of Numidia and Mauritania, Juba, the father, is common, the son and nephew Ptolemy are scarce. The kings of Sicily, in large silver, are rare: as are also those of Parthia. The kings of Judæa are rare; those of Arabia and Commagene only occur in brass, and are scarce; and likewise the kings of Bosphorus, who appear in electrum, and a few in brass. The kings of Pontus, and Phileterus, king of Pergamus, are all rare. All didrachms, both of kings and cities, are scarce, except Corinth and her colonies. The gold coins of Macedon, Alexander the Great, or Lysimachus, are common: the others very rare. All silver tetradrachms of kings are accounted medallions, and bear a high price. One of the scarcest of the small silver coins of the Greek princes is the didrachm of Alexander the Great. The Grecian monarchic money of copper may, in most instances, be considered as rare.

Of the Roman coins, the consular ones restored by Trajan are the rarest of their class. The gold consular coins are the most rare, and the silver the most common; excepting the coin of Brutus, with a cap of liberty between two daggers, EID. MART. which is scarce, and a few other instances.

Among the Roman imperial coins, we shall only mention that

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that of Otho in brass; the scarcity of which is owing to the shortness and tumult of his reign. The scarcity of other imperial coins is largely stated by Mr. Pinkerton in his tables. The Roman coins in gold are all extremely rare. The heptarchic coins of Britain are mostly rare: the money of Alfred, bearing his bull, is rather scarce; his other coin is very rare. The coins of Hardeknute are very scarce. Of kings after the conquest no English coins of John are found, except Irish only, and of Richard I. only French. In the Scottish series Alexander II. is rather scarce. Coins of John Balliol are rare, and none of Edward Balliol are found. The gold money of Scotland has always been scarce. See farther on this subject the Appendix to Pinkerton's Essay on Medals.

In the sale of medals, those that are rare are sold separate, but the common ones are put into large lots, so that they are seldom bought but by dealers. The old coins of Greek cities are generally very small; and not above a dozen states have those in gold: of these only Carthage, Cyrene, and Syracuse are rather common, and worth but double their intrinsic value. The other gold civic coins are worth from 5*l.* to 30*l.* The only two gold coins of Athens known to exist are in Dr. Hunter's collection, and if they were sold, they might bring the very highest price a coin can bear. The silver coins of Greek cities are many of them extremely scarce; the common ones are priced according to their size, for the largest are always the rarest. Those of Syracuse, Dyrrachium, Massilia, Athens, and a few other states, are common; drachmas, and lesser sizes, might bring 5*s.* each; didrachms and tridrachms from 5*s.* to 10*s.* according to their beauty and preservation. The tetradrachms, which are always most valued, may, when belonging to cities whose coins are common, bring from 7*s.* 6*d.* to 1*l.* 1*s.* Civic coins of silver that are rare are not easily valued. Ten guineas have been given for one, and competition might triple that value. The common Grecian civic coins in small brass bring from 3*d.* to 1*s.* 6*d.*, according to their preservation. Others belonging to cities, which have not above two or more coins that are known, and those of brass, bring much higher prices. With respect to the gold coins of the Greek princes, those of no rarity in the coinage of Philip of Macedon, and Alexander the Great, bear but from 5*s.* to 20*s.* above the intrinsic value. But those of the other princes are rare, and bring from 3*l.* to 30*l.* a-piece, or more. Of the silver monarchic money, with Grecian legends, the tetradrachms, which are dearest, fell from 5*s.* to 50*s.*, and those that are very rare from 3*l.* to 30*l.* The drachmas may bring half these prices, and that of other denominations in proportion. The copper coins of the Greek kings are, generally, scarcer than the silver, and ought to bring a high price. Ancient Roman *Aes*, with their divisions, bring from 2*s.* to 2*l.*, according to the singularity of their devices. Consular gold coins are worth from 1*l.* to 5*l.*: the Pompey, with his lions, 21*l.*, and the two Bruti, 25*l.* The silver rate universally from 1*s.* to 2*s.* 6*d.*, except that with the cap of liberty and daggers, and a few others, which, if genuine, may bear from 10*s.* to 5*l.* The consular copper, though rarer than the silver, may be put at an equal price. The consular silver coins, restored by Trajan, bear 1*l.* a-piece. Among the Roman imperial coins, with uncommon reverses, we may reckon a silver piece of Augustus, which will fetch from 4*s.* 6*d.* to 1*l.* 11*s.* 6*d.*; that with the legend C. MARIVS TROGVVS bears 3*l.* 3*s.* Common gold coins of Trajan are not worth above 1*l.* The medals, with unknown characters, are scarce and dear. Saxon pennies of the heptarchic princes are generally rare, and worth from 10*s.* to 10*l.* each, according to scarcity and

preservation. Those of the kings of all England, which are rare, are worth from 10*s.* to 2*l.* 10*s.*; excepting one or two very large ones, such as Henry 1*st.*, which would fetch 1*l.* 10*s.* Of English medals, the gold one of Henry, 1515, and of Edward's coronation, are worth 20*l.* each; the Mary of Trezzo, 3*l.* The dust of Simon's works are in the field of Phaulx, in gold, 1*l.*; his oval medal, in gold, upon Black's victory, is 1*l.* 3*l.*; his oval piece, if brought to sale, would bring a large sum. Queen Anne's medals in gold, intrinsically worth above 2*l.* 10*s.* 6*d.*, bear about 3*l.* a-piece. The silver, of about the size of a crown-piece, will bring 10*s.* each; the copper from 5*s.* to 10*s.* The Scottish coins are on a par with the English, excepting that the gold sell higher. The shilling of Mary, with the bull, is very rare, and brings 30*s.*; the half, 3*l.*; the ryal, 5*l.* 5*s.* The French talon of Francis and Mary brings 10*l.* 10*s.*; the Scottish one of Mary and Henry would bring 50*s.*; as would also the medal of James IV. The coronation medal of Francis and Mary is worth 20*l.* Brit's coronation medal in gold sold only for 2*l.* 2*s.* at Dr. Mead's sale in 1755, but would now bring 20*l.* The English coins struck in Ireland, or appropriated to that kingdom, are mostly of the same price as the other English coins. The St. Patrick's halfpence and farthings are rather scarce. The gun-money of James II. is quite common. The rare crown of white metal brings about 4*l.* All other Irish coins are very common. See the Appendix to Pinkerton's Essay.

MEDALS, Counterfeit, are forged imitations of ancient coins; the art of doing which is said to have arisen at the beginning of the 16th century, and has since prevailed to an astonishing degree. These counterfeit medals are distributed into six classes: 1. Medals known to be modern imitations of the ancient; but which being executed by masters, such as the Paduan, &c. have their value. 2. Medals cast from these modern masterly imitations. 3. Medals cast in moulds taken from the antique. 4. Ancient medals which are retouched, and the obverses or reverses altered. 5. Medals which are impressed with new devices, or which are soldered. 6. Counterfeit medals which have clefts, or which are plated. For the method of distinguishing these counterfeits from the true, in which the possessors or purchasers of medals are particularly interested, we refer to Mr. Pinkerton's Essay, vol. ii. p. 167, &c.

MEDALS, for the manner of striking, see COINAGE.

MEDALS, Academy of See ACADEMY.

MEDALS, Cabinet of, may be divided into three distinct sizes: 1. The large and complete cabinet, containing, or intended to contain, every issue of the mint, in every age and every country. The late king of France had the most richly furnished cabinet of this kind in existence, and which is calculated to have cost near 100,000*l.* sterling. That of the late Dr. Hunter was, perhaps, one of the best private cabinets ever formed in this style; and cost about 21,000*l.* 2. The smaller cabinet, the collector of which, confining himself to the forming of five or six sequences, as of middle and small Roman brass only, of English pennies, or of groats, or any other particular series, considers other medals as out of his line of collecting, though he may purchase a few desolate ones, or such as belong to other sets, in order to give variety to his collection. Such a cabinet may incur an expence of from 200*l.* or 300*l.* to 1000*l.* 3. The least cabinet, or casket of medals, which may include all little collections of coins, from 100 to 1000 or 2000. In this not above one or two sequences can well be formed; but the amateur pleases his fancy by the miscellaneous insertion of any article which curiosity or other motives may incline

cline him to procure. In the formation of the large cabinet, it is to be observed, that in the grand division of ancient coins, as distinct from the modern, the Greek medals, of every denomination, can never be arranged by the metals, or sizes, like the Roman; for no series of any one metal, or size, can be found of this class in the most opulent cabinet. On this account the civic coins of all metals and sizes, are digested in alphabetical order, and the monarchic in chronological. The same rule is to be observed in the Roman consular medals, which are arranged in alphabetical series of the families, like those of the Greek cities. The proper divisions of a grand and complete cabinet, comprehending the part allotted to ancient coins, are stated by Mr. Pinkerton as follows: 1. The coins of cities and free states, in alphabetical order; whether using Greek, Roman, Punic, Etruscan, or Spanish characters. 2. Kings in chronological series, both as to foundation of empire and seniority of reign. 3. Heroes, heroines, and founders of empires, and of cities. 4. Other illustrious men and women. 5. Roman *Aves*. 6. Coins of families, commonly called consular. 7. Imperial medallions. 8. Imperial gold. 9. Imperial *minimi*, of all metals. 10. Imperial silver. 11. Imperial first brads. 12. Second brads. 13. Third brads. 14. Colonial coins, which are all of brads. 15. Greek cities under the emperors, of all metals and sizes. In a smaller cabinet they may be put with the Roman, according to their metal and size. Those without the emperor's head go to class 1, though struck in Roman times. 16. Egyptian coins struck under the Roman emperors, of all metals and sizes. They are mostly of a base metal, called by the French writers "potin," being a kind of pot-metal, or brittle brads. 17. "Contorniat," or ticket medals. 18. Coins of Gothic princes, &c. inscribed with Roman characters. 19. Coins of southern nations, using unusual alphabets; as the Persian, Punic, Etruscan, Spanish. 20. Coins of northern nations, using unusual characters; as the Runic and German.

In the modern part no series can be found of copper that will go back above two centuries; but sequences of gold and of silver may be arranged of all the different empires, kingdoms, and states, so far as their several coinages will allow. Those of England and France will be the most perfect. Modern silver is commonly arranged in three sequences; the dollar size, the great size, and the penny size. The metals of each modern country ought of course to be separated; though it is best to arrange each set in chronological order, whatever be their size or the metal.

The formation of a cabinet of the second class will admit of observing the directions for the former, so far as this is meant to extend. But as it includes only a few complete sequences, either of ancient or modern coins, some particular instructions may be necessary. If, *e.g.* the collector means to form a series of the large brads, he will find the coins of four or five emperors so scarce as not to be attainable in that series, even at any price. He must, therefore, supply their places with a middle brads, as is allowed with regard to Otho even in the best cabinets, there not being above three coins of that emperor in large brads known in the world, whereas of the middle brads two or three hundred may exist. If this be allowed in one instance, why not in others? Why may not Tiberius or Pertinax appear in the middle brads as well as Otho? In cabinets of the second class the collector may mingle the middle with the large brads as he thinks proper; and in like manner the small with the middle. In the small sequences there can be no harm in his mixing gold, silver, and brads, as chance or curiosity may lead him to purchase any of these metals.

In like manner, if, in the modern part of the smaller cabinet, any coin of a series is of high price, or of bad impression, there can be no impropriety in putting another of the same reign which is cheaper, or better executed, though of a different denomination, and a little larger size. In short, the collector has no rules, but in the Greek cities and Roman families to observe alphabetical order, and chronology in every thing else. The management in a cabinet of medals may be conducted by the observations already made upon those of the two higher descriptions.

MEDALS, Cast, are those which are not struck, but cast in a mould.

MEDALS, Contourniated. See **CONTOURNIATED.**

MEDALS, Covered or Plated, are those which have only a thin silver leaf over the copper, but which are struck so artfully, that the cheat does not appear without cutting them; these are the least suspected.

MEDALS, Countermarked, are those which have marks cut either on the side of the head, or of the reverse. These countermarks serve to denote the change of their value; and this kind is much inquired for by the curious. See **MEDALS, supra.**

MEDALS, Dipt, are struck of pure copper, and afterwards silvered. This is a contrivance that the curious have frequent recourse to, in order to complete their silver sets.

MEDALS, Grained or Indented, are those whose edges are cut, or notched like teeth, which is a sign of purity and antiquity. They are common among the consulars, but we have none later than Augustus. There are several of them, however, among those of the kings of Syria.

MEDALS, Impressions or Casts of. A very easy and elegant way of taking impressions or casts of medals and coins is this: melt a little isinglass glue, made with brandy, and pour it thinly over the medal, so as to cover its whole surface; let it remain on for a day or two, till it is thoroughly dry and hardened, and then taking it off, it will be fine, clear, and hard as a piece of Muscovy glass, and will have a very elegant impression of the coin. In order to render the relief of the medal more apparent, a small quantity of carmine may be mixed with the melted isinglass; or the medal may be previously coated with leaf-gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it; but the use of leaf-gold is apt to impair a little the sharpness of the impression. Impressions of medals may be likewise taken in putty of the true kind, made of calx of tin and drying oil. These may be formed in the moulds, previously taken in plaster or sulphur; or moulds may be made in its own substance, like those of plaster. These impressions will be very sharp and hard; but the greatest disadvantage attending them is their drying very slowly, and being liable in the mean time to be damaged.

Sulphur is sometimes used to take off impressions of medals, coins, &c. The method is this: having made a ledge of clay about the work whose impression is desired, and carefully oiled the whole, gently pour brimstone melted in a covered vessel, to prevent its firing, upon the metal. About the edge of this mould make a border of clay, as before, and lightly oil the internal surface of both; then gradually put into it, to the thickness of about a quarter of an inch, a mixture made up with calcined alabaster and water, to the consistence of stiff honey. This soon growing hard, may be taken out of the mould, and gives figures of the coin or medal. Boyle's Works, abr. vol. i. p. 151. A method somewhat different is described under the article **BRIMSTONE.**

The brittleness of sulphur is a great objection to this method, and the plaster of Paris, which is often used for taking

taking impressions, is too soft: however, a coat or layer of thin metal, formed over the plaister, would be a considerable defence. This is the cheapest and most convenient metal for this purpose: let thin tin-foil, such as is used for silvering looking-glasses, be laid over the medal or coin intended to be taken off, and then rubbed either with a brush, the point of a skewer, or a pin, till it has received perfectly the impression of the medal; then pare off the tin-foil round the edge of the medal, till it is brought to the same circumference; afterwards the medal must be reversed, and the tin-foil will drop off into a chip-box, or mould ready to receive it; the concave side of the foil, or that which is laid on the face of the medal, being uppermost; upon this pour plaister of Paris, made in the usual manner, and when dry the cast figure may be taken out of the box or mould, with the tin-foil sticking on the plaister, the convex side being now uppermost, in which position it is to be kept in the cabinet after it becomes dry. To have an impression very perfect, the thinnest tin-foil should be made use of. The impressions taken in this manner almost equal silver medals in beauty, and are very durable. If the box or mould be rather larger than the impression of tin-foil, the plaister, when poured on, runs round its edges, and forms a kind of white frame, or circular border round the foil, whence the new made medal appears more neat and beautiful. If this tin-foil is gilt with gold-leaf, by means of thin isinglass glue, the medal will resemble gold.

Casts of medals may be made likewise with iron, prepared in the following manner: Take any iron bar or piece of a similar form; and having heated it red-hot, hold it over a vessel containing water, touch it very slightly with a roll of sulphur, which will immediately dissolve it, and make it fall in drops into the water. When a sufficient quantity of iron is thus dissolved, pour the water out of the vessel, and pick out the drops formed by the melted iron from those of the sulphur which contain little or no iron, and will be distinguishable from the others by their colour and weight. The iron will, by these means, be rendered so fusible, that it will run with less heat than is required to melt lead; and may be employed for making casts of medals, and many other such purposes, with great convenience and advantage.

We have an easy method of procuring the true impression or figure of medals and coins, by Mr. Barker in the *Philos. Trans.* N^o 472. sect. 13. vol. xliii. p. 77.

Take a perfect and sharp impression on the finest black sealing-wax, of the coin or medal you desire. Cut away the wax round the edges of the impression; then with a preparation of gum-water, of the colour you would have the picture, spread the paint upon the wax impression with a small hair-pencil, observing to work it into all the sinking or hollow places, these being the rising parts of the medal; and the colouring must be carefully taken from the other parts with a wet finger. Then take a piece of very thin post-paper, a little larger than the medal, and moisten it quite through. Place it on the wax impression, and on the back of the paper lay three or four pieces of thick woollen cloth or flannel of about the same size. The impression, with its coverings, should be placed between two smooth iron plates, about two inches square, and one-tenth of an inch thick.

These must be carefully put into a small press, made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickness, having a couple of long male serews running through them, with a turning female screw on each, to force the plates together. These being brought evenly together by means of the serews,

will take off a true and fair picture of the medal; which, if any deficiencies should appear, may easily be repaired with a hair-pencil or pen, dipped in the colour made use of.

If a relief only be desired, nothing is necessary but to take a piece of card, or white paste-board, well soaked in water, then placing it on the wax mould, without any colouring, and let it remain in the press for a few minutes, a good figure will be obtained.

This method of taking off medals, &c. is convenient, and seems much more so than the several inventions usually practised in sulphur, plaister of Paris, paper, &c. wherein a mould must be formed, either of clay, horn, plaister, or other materials, which requires time and trouble.

Some take impressions on paper from the medals themselves, by passing them through the rolling-press, and colouring them afterwards; but this is not only more difficult, but does great injury to the medals, by impairing the sharpness of their most delicate and expressive strokes: whereas wax does not hurt the finest medal in the least degree; and though a brittle substance, yet it effectually resists the force of a downright pressure.

Red seems the best colouring, and therefore black wax is directed to be used; but if the pictures are chosen in black and white, to resemble copper-plates, the wax should be red; for the wax and paint ought to be of different colours, in order to distinguish when the colour is laid on properly, or rightly cleared away.

The substance of medals, being metalline, is liable to be corroded; and the figures being raised, are also liable to be effaced by friction. Hence it is rare to find any perfectly preserved. Gems are not subject to these inconveniencies. See GEM.

MEDALS, *Mutilated*, are those that are not entire, or are much defaced.

MEDALS, *Redintegrated*, are those wherein we find the letters rest, which shew that they have been restored by the emperors.

MEDAL, *Repairing a*. See REPAIRING.

MEDALS, *Restitution of*. See RESTITUTION.

MEDALS, *Votive*. See VOTIVE.

MEDALS *without Reverse*. See REVERSE.

MEDALETS, a name given by Mr. Pinkerton to those small coins or missilia, scattered among the people on solemn occasions, those struck for the slaves in the Saturnalia, private counters for gaming, tickets for baths and feasts, tokens in copper and lead, and the like. Baudelot, in his curious and entertaining work, "*L'Utilite des Voyages*," has produced many singular specimens of medalets; for some of which see Pinkerton's *Essay on Medals*, vol. i. p. 227, &c.

MEDALLION, or MEDALION, a medal of extraordinary size.

The word is formed from the French *medaillon*, or Italian *medaglione*, which signify the same, or a large medal; and which were originally formed from *metalliones*, a name by which these pieces are frequently called in ancient Latin writers.

Medallions were never any current coins, as some medals probably were: they were struck purely to serve as public monuments, or to be presented by the emperor to his friends, and by the mint-makers to the emperor, as specimens of fine workmanship.

They were struck upon the commencement of the reign of a new emperor, and other solemn occasions; and frequently, the Greek medallions in particular, as monuments of gratitude, or of flattery. Sometimes they were trial or pattern-pieces, "*testimonia probatæ monetæ*;" and such abound after the reign of Maximian, with the "*Tres Monetæ*"

netz" on the reverse. It is observed, that all Roman pieces in gold, exceeding the denarius aureus; all in silver, superior to the denarius; and all in brass, superior to the sestertius, or what the medallists term large brass, are comprehended under the description of medallions. Mr. Pinkerton, however, thinks that the gold medallions, weighing two, three, or four aurei only, passed in currency as the Greek gold didrachms, tridrachms, or tetradrachms, according to their size. The like may be said of the silver, which are commonly of the value of a Greek tetradrachm, which went in currency for four denarii. But it is not of much moment whether any of the pieces called medallions passed as coin with the ancients; it is sufficient to know what kind of coins passed under that denomination. The brass medallions, which are the largest, are commonly of the most exquisite workmanship, and uncommon device. Many of them are composed of two sorts of metal, the centre being copper, with a ring of brass around it, or the contrary. The inscription of such sometimes bites upon both metals, and at other times runs upon one. Medallions of this kind are inimitable, and of undoubted antiquity. Medallions from the time of Julius to that of Hadrian are very uncommon, and of very high price; from Hadrian to the close of the western empire they are, generally speaking, less rare. The types of the Roman medallions are often repeated upon common coin: hence they appear of less importance than the Greek, impressions of which are frequently most uncommon, and no where else to be found. A remarkable distinction between the Greek and Roman medallions lies in their different thickness; the Roman being often three or four lines thick, while the others seldom exceed one. By the Greek medallions we mean those struck in the imperial periods; for few Greek medallions are found prior to the emperors of Rome. Of Greek medallions, preceding the Roman empire, few are known. Some occur of Rhodes; and there is a fine one struck at Syracuse, upon the defeat of Icetas by Timoleon. The medallion is of silver, with the head of Ceres upon one side, and upon the other a female figure, perhaps representing Sicily or Syracuse, in a car, a victory crowning her, and spoils in the exergue. Its workmanship is fine, but not equal to the gold coin of the same Icetas, struck at Syracuse, ΕΠΙ ΙΚΕΤΑ, under Icetas, which is a perfect gem, surpassing all description. Syracuse also affords a most remarkable medallion on another great occasion. The only one perhaps existing formerly belonged to Dr. Combe, and was engraven by his order. It is exquisitely wrought, in high relief, and perfect preservation; of copper, and about two inches in diameter. Upon one side is a female head, covered with a helmet, on which is a caduceus, and ΡΟΜΑ. Upon the other is a man's head, with a helmet wreathed with laurel, and M. M. Dr. Combe thinks this fine piece, now in Dr. Hunter's cabinet, was struck by Syracuse, in honour of Marcus Claudius Marcellus, who besieged and took that city, 210 years B.C. This medallion is most remarkable for its being unique; for its beauty, for its preservation, and for the portrait of this great man. There are perhaps the only Greek medallions prior to the Roman empire. Many Roman medallions have s. c., as being struck by order of the senate; others have not, as being by order of the emperor. Of Augustus a noble medallion was found in Herculaneum, and Khell published a dissertation upon it. There are medallions of Augustus and Tiberius, struck in Spain; and one of Livia, at Patrae in Achaia: one in brass of Antony and Cleopatra; reverse, two figures in a car, drawn by sea-horses. Of Tiberius there are many, and also of Claudius. There are also some of Agrippina, Nero, Galba, Vespasian, and Domi-

tian. Those of Trajan and Hadrian have generally a very broad rim, beyond the legend, with indented circles; and of Hadrian, Baldini gives no less than 47. There are fine medallions of Commodus, and his famous mistress Marcia; their heads are joined, and she wears a helmet. One of Pertinax bears, for reverse, that emperor sacrificing, with VOTIS DECENNALIBUS. There are many of Severus, Gordian III., and Philip; afterwards they are numerous of Gallus, Valerian, Gallienus, Aurelian, Probus, Diocletian, Maximian I., Constantius I., Constantine I. and II., Constans, and Constantius II. Of other emperors they are scarcer. In Dr. Hunter's cabinet, among many others, there is one of Otacilia. The Greek medallions of Roman emperors are far more numerous than the Roman. All medallions, one or two instances excepted, are very rare, and of princely purchase. Even in the richest cabinets, 20 or 30 medallions are esteemed of great weight. In the 17th century, however, queen Christina was so fortunate as to procure about 300; and the king of France's cabinet was possessed of about 1200 medallions. Dr. Hunter's cabinet contains about 400, exclusive of Egyptian. There are also Latin medallions, of a size between first and second brass, or larger than our half-crown, easily distinguishable by their thickness, and uncommon neatness and manner. These are, by Italian medallists, called "Medaglioncini," or little medallions. In Dr. Hunter's collection is a fine one of Alexander Severus and Julia Mammæa, face to face; reverse their figures, with FELICITAS TEMPORVM. Pinkerton's Essay on Medals, vol. i.

MEDALLION, in *Architecture*, is any circular tablet on which are imbossed figures or busts.

MEDAMA, in *Geography*, a town of the island of Ceylon; 16 miles N. of Candi.

MEDAMPE, a town of the island of Ceylon; 36 miles N. of Columbo.

MEDANIPEK, a town of Servia, on the river Ipek; 22 miles S.W. of Orsova.

MEDARD, St., a town of France, in the department of the Lot; 8 miles N.W. of Cahors.

MEDAUAR, a town of Arabia, in the province of Yemen; 28 miles N.W. of Dsejebi.

MEDAUSO, a town of Africa, in the country of Bergeoo; 150 miles S.W. of Wara.

MEDE, JOSEPH, in *Biography*, a learned divine, was born in 1586, at Berden in Essex, and in 1602 entered of Christ's college, Cambridge, where he studied with intense application, was chosen fellow, and proceeded to his degree of bachelor in divinity. He refused several preferments, particularly the provostship of Trinity college, Dublin, which was repeatedly offered him by archbishop Usher. He died in 1638. His works have been collected into one volume folio. The principal is his Commentary on the Apocalypse; in explaining which, his plan has been followed by bishop Newton, and a number of other great divines. Biog. Brit.

MEDEA, in *Geography*, a town of Algiers, in the province of Titterie, surrounded with mud walls. anciently "Lamida;" 32 miles S.W. of Algiers. N. lat. 26 5'. E. long. 2° 50'.

MEDEA, *El, Mebdia, or Mehedia*, a town of Africa, in the kingdom of Tunis, on a peninsula, on the east coast, formerly a place of great strength and importance. The port, which was an area of nearly 100 yards square, lies within the walls of the city, with its mouth opening towards Cap-oudia; but at present not capable of receiving the smallest vessel; 80 miles S. of Tunis. N. lat. 35° 20'. E. long. 11°.

MEDEBACH,

MEDEBACH, a town of Westphalia; 32 miles W. of Cassel. N. lat. 51° 10'. E. long. 8° 48'.

MEDELAIN, a town of Spain, in Ultramaradura, on the Guadiana, being the native place of Fernando Cortez. It is an ancient town, having been founded by Q. C. Metellus, the Roman consul, and called by him "Metellum;" 13 miles S. E. of Merida. N. lat. 38° 43'. W. long. 5° 47'. — Also, a town of Mexico, in the province of Tlaxcala, 25 miles S. of Vera Cruz, on a river of the same name, which runs into the gulf of Mexico, N. lat. 19°.

MEDELPAD, a province of Sweden, in the division called Nordland, bounded on the north-east by Angermandland, on the east by the gulf of Bothnia, on the south-west by Helsingland, and on the north-west by Jamtland, or north by the river Indal, and south by the Niirunda; from 13 to 20 leagues from north to south, and upwards of 30 from west to east. This province, though mountainous and woody, contains several valleys of meadow and arable land, interspersed with rivers and lakes, which yield abundance of fish. The grain, which is sown here about Whitsuntide, produces corn that ripens in ten weeks; and it is sufficient to supply the inhabitants. The forests abound with game of all sorts, elks, rein-deers, beavers, martins, weasels, lynxes, foxes, and wild fowl. The inhabitants have plenty of cattle, and traffic in timber, hops, flax, hemp, butter, fruits, and dried fish. The only sea-port is Sundswall, which is a mean though trading town, situated in a dry and sandy tract, near the bottom of a bay, with a convenient port. This province lies in N. lat. 62° 30'.

MEDELSHEIM, a town of France, in the department of Mont-Tonnerre, and chief place of a canton, in the district of Deux-Ponts. The place contains 338, and the canton 4521 inhabitants, in 15 communes.

MEDEMA, a town of Arabia, in the province of Yemen, and the Imam's dominions: it is the capital of Hamdan, and the residence of a schiech; 10 miles N. N. W. of Sana.

MEDEMBLICK, a sea-port town of Holland, at the entrance into the Zuyder see, small though ancient, and, before Enckhuysen and Hoorn were built, the capital of North Holland. The inhabitants trade chiefly in timber, which they bring from Norway, and other northern parts of Europe. Its vicinity abounds with rich pastures. As the land is here lower than the waters, it requires very strong dykes and dams to defend it from the fury of the waves; 26 miles N. of Amsterdam. N. lat. 52° 29'. E. long. 4° 58'.

MEDEN, a river of the Isle of Wight, which runs into the sea between East and West Cowes, but is navigable for small vessels to Newport. — Also, a river, which rises from a lake in the duchy of Bremen, and discharges itself into the Elbe, two miles below Otterndorf, N. lat. 53° 55'. E. long. 8° 44'.

MEDENA, in *Surgery*, a name given by Paracelsus to a particular class of ulcers.

MEDENAM, in *Geography*, a town of Prussia, in the province of Samland; 12 miles N. W. of Konigsberg.

MEDEOLA, in *Botany*, is the Linnæan name of this genus, thought by Professor Martyn to be "a diminutive of *Medea*, the famous sorcerers of antiquity." Linn. Gen. 179. Schreb. 240. Willd. Sp. Pl. v. 2. 270. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 327. Michaux. Boreal-Amer. v. 1. 214. Juss. 42. Lamarck Illustr. t. 266. — Class and order, *Hexandria Trigynia*. Nat. Ord. *Sarmentacea*, Linn. *Asparagi*, Juss.

Gen. Ch. *Cal.* Perianth none. *Cor.* inferior, deeply cloven into six, ovate-oblong, equal, spreading, revolute segments. *Stam.* Filaments six, awl-shaped, the length of

the corolla; anthers incumbent. *Pist.* Germens three, oovulate, ending in the styles; stigmas recurved, thickish. *Peric.* Berry roundish, trisid, three-celled. *Seeds* solitary, heart-shaped.

Ess. Ch. Calyx none. Corolla deeply six-cleft, revolute. Berry three-seeded.

Obs. Linnæus remarks that *M. virginiana*, which he received from the celebrated Gronovius, had four petals; and Jussieu further says, that the same species having verticillate leaves, and the habit of *Trillium* or *Paris*, is very nearly akin to those genera. *Jacquinia rusticifolia* was originally considered by Linnæus as a *Medeola*.

1. *M. virginiana*. Virginian Medeola, or Indian Cucumber. Linn. Sp. Pl. 483. Sims in Bot. Mag. t. 1316. — Leaves verticillate. — A native of Virginia, flowering in June. Michaux says that it is common in moist woods throughout the whole of North America. *Root* tuberous and fibrous. *Stem* scarcely a f. or high, simple, erect or somewhat scandent, about the thickness of a quill, covered with a reflexed, hairy down. *Leaves* whorled, from six to eight in the upper and three in the lower whorl, ovate, pointed. *Flowers* on pendent stalks, greenish-yellow, with purple filaments, without smell. Its root, which is eaten by the Indians, is said to resemble the Cucumber in flavour, and hence the English name.

2. *M. asparagoides*. Broad-leaved shrubby Medeola. Linn. Sp. Pl. 484. (*Asparagus africanus scandens*, myrtilifolius; Til. Pis. t. 12. f. 1.) — Leaves alternate, ovate, unequally heart-shaped at the base. — A native of the Cape of Good Hope. It flowers during the greater part of the winter, and was cultivated in 1702 by the dukes of Beaufort. *Root* composed of several oblong knobs, uniting at the top like that of a *Ranunculus*. *Stems* round, twining, branched, several feet long. *Leaves* sessile, acutely pointed, light-green beneath, but dark above. *Flowers* one or two on a stalk, dull white. Michaux is of opinion that *M. asparagoides* should be referred to another genus, and Mr. Gawler says, in the Botanical Magazine, that the following, *M. angustifolia*, together with this, should be excluded from *Medeola*.

3. *M. angustifolia*. Narrow-leaved Medeola. Willd. n. 3. (*Asparagus africanus scandens*, myrtilifolius angustiflorus; Til. Pis. t. 12. f. 2.) — Leaves alternate, lanceolate. — A native also of the Cape, flowering in the early spring. *Root* similar to the preceding. *Stalks* weaker, not so much branched, but climbing higher. *Leaves* long and narrow, of a greyish colour. *Flowers* lateral, two or three on a stalk, of an herbaceous white appearance.

Professor Martyn observes that "the flowers of these two latter species making no great appearance, the plants are not preserved for their beauty; but as their stalks are climbing, and their leaves are in full vigour in winter, during that season they add to the variety of the green-house."

MEDEOLA, in *Gardening*, comprises plants of the herbaceous climbing kind, of which the species cultivated are the Virginian medeola (*M. virginiana*); the broad-leaved shrubby medeola (*M. asparagoides*); and the narrow-leaved medeola (*M. angustifolia*).

Method of Culture. — These sorts of plants may be increased by planting off-sets, taken from the roots in the summer season, about July, in pots filled with good, rich, light mould, remaining in the open air till autumn, when they should be removed into the green or hot-house; but the latter, when intended to fruit. While the plants have a vigorous growth, they should be frequently refreshed with water; but, as the stems decay, very little, especially when placed in an eastern aspect.

The second and third forts may also be raised from feed ; but they commonly remain long in the earth before they come up.

The first fort is sufficiently hardy to stand in the open air during the winter season.

They all afford variety in green-house and stove collections, in the winter season, among other plants.

MEDERA, or MEDRA, in *Geography*, a town of Africa, in the kingdom of Bournou.

MEDES, *Empire of*. See EMPIRE and MEDIA.

MEDFIELD, in *Geography*, a township in Norfolk county, Massachusetts; 20 miles S.W. of Boston; incorporated in 1650, and containing 745 inhabitants.

MEDFORD, a pleasant, thriving, compact town in Middlesex county, Massachusetts, situated on Mytlick river, three miles from its mouth, and four miles N. of Boston. The river is navigable for small vessels to this place, where it meets the Middlesex canal. The township was incorporated in 1630, and contains 1114 industrious inhabitants. Here are four distilleries, which have distilled in one year 252,450 gallons of rum. About four millions of bricks are made annually in this town, most of which are conveyed to Boston.

MEDHERAM, a town of Africa, in the kingdom of Fezzan; 330 miles S.S.E. of Mourzouk.

MEDHERAM *Iza*, a town of Africa, in the desert of Berdoa. N. lat. 24° 35'. E. long. 16 24'.

MEDHRA, among Hindoo metaphysicians and mythologists, is a name of the *Yoni*; which see.

MEDIA, or, as it was sometimes called, *Medena*, in *Ancient Geography*, an extensive country of Asia, and the seat of a powerful empire, bounded, according to Ptolemy, on the north by part of the Caspian and Hyrcanian sea, on the south by Persia, Susiana, and Assyria, on the east by Parthia and Hyrcania, and on the west by Armenia Major. In ancient times it was divided into several provinces, which by a later arrangement were reduced to two, the one called "Media Magna," and the other "Media Atropatra," or simply *Atropatene*; which see. The cities of note in this latter part of Media were Gaza, the metropolis (which see); Sanina, situated between the Araxes and the Cambyfes; Fazina, between the Cambyfes and the Cyrus; and Cyropolis, between the Cyrus and the Amardus. This tract was inhabited by the Cadusians and Caspians, a barbarous and inhuman race, originally sprung from the Scythians.

Media Magna was bounded by Persia, Parthia, Hyrcania, the Hyrcanian sea, and Atropatene. The most remarkable cities in it were Ecbatana, Laodicea, Apamea, Rega or Regaia, and Arfacia. This part of Media was inhabited by the Carduchians, Marandæans, Gehans, Syro-Medians, Margasians, &c. The mountains of this country, according to Ptolemy and Strabo, are Choatra, parting Media from Assyria; Xagrus, dividing it from the same Assyria on the east, which, according to Polybius, was 100 cubits high; Parachoatra, placed by Ptolemy on the borders towards Persia, and by Strabo on the confines of Media, Hyrcania, and Parthia. To these, which are the boundaries between Media and the adjacent provinces, may be added the Orontes, the Jafonius, and the Coronus, in the interior of the country. The rivers of note, according to Ptolemy, are the Straton, the Amardus, the Cyrus, and the Cambyfes; properly belonging to the provinces of Ghilan and Mazanderan, and not to Media Proper, as described by the ancients. The northern parts of Media, lying between the Caspian mountains and the sea, are very cold and barren: the present inhabitants make their bread of dried almonds, and their drink of the juice of certain herbs. The snow

lies on the mountains for nine months in the year. But the southern parts produce all sorts of grain, and necessaries of life, and are so pleasant, that the country adjoining to Tauris, probably the ancient Ecbatana, is called the garden of Persia. It has large plains, one of which was called Nyfa, and was famous for its numerous studs of horses, that were kept in it for the use of the Persian monarchs. The climate of Media is various: that part which lies between the mountains and sea is cold and swampy, and subject to vapours exhaling from the Caspian sea; but the provinces that are more remote from the sea, enjoy a very salubrious air, though liable to heavy rains and violent storms, especially in the spring and autumn. In the neighbourhood of Tauris, it is said that 60 different kinds of grapes, of exquisite flavour, have been found.

The Medes are said to have sprung from Madai, the third son of Japhet; and in process of time several persons from the adjacent countries settled here, on account of the fertility of the soil, and gave rise to the various tribes into which these people were anciently divided. Their government was originally monarchical, and they seem to have had their own kings in the earliest times. They were first brought under the Assyrian yoke by Pul, said to be the founder of that monarchy, or by his immediate successor Tiglath-Pileser. In the reign of Sennacherib they shook off this yoke, and fell into anarchy until the reign of Dejoces. Their kings after the revolt were quite absolute, and controuled by no law. The Medes were once a very warlike people, but in process of time became one of the most effeminate nations of Asia. They used the same armour with the Persians, whom, it is said, they instructed in the art of war; and it is likewise asserted, that they first introduced luxury into Persia, which ultimately occasioned the downfall of that empire. Polygamy was so far from being disreputable among them, that they were bound by law to maintain, at least, seven wives, and those women were regarded with contempt, who maintained fewer than five husbands. In war they smeared their arrows with a bituminous liquor called naphtha; so that when the arrows were set on fire and shot from a slack bow, they burnt the flesh with such violence that water served to increase rather than to extinguish the flame. They are said likewise to have bred a number of large dogs, to whom they threw the bodies of their friends, parents, and relations, when at the point of death, considering it as dishonourable to die in their beds, or be laid in the ground. Some writers charge the Medes with being the first who made eunuchs; but others impute this execrable practice to the Persians. With the Medes originate the custom of confirming alliances with the blood of the contracting parties, which afterwards prevailed among all the eastern nations, even in the Roman times. When they concluded alliances, they tied together, with a hard bandage, the thumbs of their right hands, until the blood starting to the extremities was, by a slight cut, discharged. This they mutually sucked, and a league thus confirmed was esteemed most awful, as mysteriously solemnized with the blood of the parties. The laws and religion of the Medes were much the same with those of the Persians. (See PERSIA.) When a law was once enacted, it was not in the king's power to repeal it, or to reverse a decree he had once made; whence the laws of the Medes are, in the sacred writings (Dan. vi. 8.) called unchangeable. Their kings were treated with great respect; and whenever they appeared in public, they were attended by music, and numerous guards, consisting of the prime nobility; their wives, children, and concubines, forming part of their retinue, even when they headed their armies in the field. We are ignorant of their arts, learning, and trade; but this is known, that during

during the short period of their monarchy, they seem to have applied their thoughts only to warlike exercises, viz. to horsemanship and archery, in which they surpassed all other nations; the Median horse being no less celebrated by the ancients than the Persian infantry in subsequent ages.

In detailing their history, we begin with Pul, or Tiglath-Pileser, already mentioned, who first brought them under subjection. From the time of Pul, or Tiglath-Pileser, who succeeded his father in the year 740 B.C., they remained subject to the Assyrians till about the latter end of the reign of Sennacherib, 710 B.C., when, emancipating themselves from Assyrian bondage, they fell into a state of anarchy. This circumstance, as Herodotus informs us, gave Esar-Haddon, or Assar-Haddon, who succeeded Sennacherib, an opportunity of reducing a great part of Media, if not the whole country, under subjection. This anarchy is supposed to have lasted one year; for Dejoces, called Arphaxad in the book of Judith, was killed by Saoduelius or Nebuchadonosor, in the year 656. From the commencement of the reign of Dejoces to the destruction of Nineveh, 601 B.C., Media may properly be styled a kingdom. From the destruction of Nineveh, we may therefore date the rise of the empire of the Medes. (See *ΕΜΠΡΟΚ.*) Their empire lasted till the taking of Babylon; for we learn from Xenophon, that after the reduction of that city, Cyrus went to the king of the Medes at Ecbatana, and succeeded him in the kingdom. The empire of the Medes lasted 65 years, at the period in which the Persian empire took rise in Cyrus. Passing over the fabulous history of the Medes, we shall begin with the reign of Dejoces, who was chosen by them as their judge, and who, aspiring to the sovereign power, performed that office with the strictest regard to justice. Upon his resignation of this office, licentiousness prevailed, and it was found necessary to appoint a king; upon which Dejoces was named to the sovereignty, and with universal applause placed upon the throne 710 B.C. As soon as he was elected king, and vested with the supreme power, he threw off the mask, and became a tyrant. Ecbatana was built and chosen for the royal residence, and a stately palace was erected for the sovereign. Dejoces, having enacted various laws for the government of the kingdom, and having, in a considerable degree, civilized his unpolished subjects, entertained thoughts of extending the limits of his new kingdom, and with this view he invaded Assyria. Nebuchadonosor, however, at that time king of Assyria, met him in the plain of Ragau, and a battle ensued, in which the Medes were utterly defeated, and Dejoces was slain, after a reign, according to Herodotus, of 53 years. The Assyrian king, availing himself of his success, reduced several cities of Media, and among the rest Ecbatana, which he almost utterly destroyed. Dejoces was succeeded by his son Phraortes, 647 B.C., and, not satisfied with the kingdom of Media, he invaded Persia, and is said to have brought that nation under subjection to the Medes. Such is the account of Herodotus; but others ascribe the conquest of Persia, not to Phraortes, but to his son and successor Cyaxares. Phraortes, however, subdued several neighbouring nations, and made himself master of almost all the Upper Asia, lying between mount Taurus and the river Halys. Emboldened by his success, he invaded Assyria, subdued a great part of the country, and even laid siege to Nineveh, the metropolis. Here he perished, with the greater part of his army, after having reigned 22 years. Upon the death of Phraortes, his son, Cyaxares I., a brave and enterprising prince, succeeded him, 625 B.C. Having well disciplined his troops, and recovered the territories which the Assyrians had taken during the reigns of his father and grandfather, he marched against Nineveh, but after

having laid close siege to the city, he was obliged to retreat, and to employ his troops in the defence of his own kingdom, against a formidable army of Scythians, who, having driven the Cimmerians out of Europe, pursued their flying enemies, and were ready to enter Media. The two armies engaged, and the Medes were utterly routed. The conquerors overran, not only all Media, but the greater part of Upper Asia, extending their conquests into Syria, as far as the confines of Egypt. Cyaxares, despairing of being able to overpower the Scythians by force, had recourse to stratagem; and invited them to a general feast, which was prepared in every family. Each host intoxicated his guest; and in that condition the Scythians were massacred, and the kingdom delivered from a long and cruel bondage. The Medes were afterwards engaged with the Lydians; and during the engagement there happened a total eclipse of the sun, said to have been foretold by Thales the Milesian. Both parties were terrified, and soon after concluded a peace by the mediation of Labynetus, that is Nebuchadnezzar, king of Babylon, and Syennesis, king of Cilicia. This peace was confirmed by the marriage of Aryenis, the daughter of Halyattes, and Astyages, the eldest son of Cyaxares; and of this marriage was born in the ensuing year Cyaxares, who, in the book of Daniel (ch. v. 31.) is called Darius the Mede. Cyaxares, disengaged from the Lydian war, returned the siege of Nineveh; and having formed a strict alliance with Nebuchadnezzar, king of Babylon, they joined their forces, and took and destroyed the city. (606 B.C.) With this prosperous event commenced the great successes of Nebuchadnezzar and Cyaxares; and thus was laid the foundation of the two collateral empires, as they may be called, of the Medes and Babylonians, which rose on the ruins of the Assyrian monarchy. After the reduction of Nineveh, the two conquerors led the confederate army against Pharaoh-Necho, king of Egypt, who was defeated near the Euphrates, and compelled to resign what he had formerly taken from the Assyrians. After this victory they reduced all Cœlesyria and Phœnicia; then they invaded, and laid waste Samaria, Galilee, and Scythopolis; and at last besieged Jerusalem, and took Jehoiakim prisoner. Nebuchadnezzar afterwards pursued his conquests in the west, and Cyaxares subdued the Assyrian provinces of Armenia, Pontus, and Cappadocia. Again uniting their forces, they reduced Persia and Suriana, and accomplished the conquest of the Assyrian empire. The prophet Ezekiel (ch. xxxii. 22 &c.) enumerates the chief nations that were subdued and slaughtered by the two conquerors Cyaxares and Nebuchadnezzar.

Cyaxares, having thus erected the kingdom of Media into a powerful empire, and shared the new acquisitions with his Babylonian ally, died in the 40th year of his reign, and was succeeded by his son Astyages, called in scripture Ahafuerus. This prince had by Aryenis, already-mentioned, Cyaxares II., called in scripture Darius the Mede, who was 62 years of age when Belshazzar was slain at the capture of Babylon. In the year when Cyaxares was born, Astyages gave his daughter Mandane, whom he had by a former wife, to Cambyles, a Persian; from which marriage sprung Cyrus, the founder of the Persian monarchy, and the restorer of the Jews to their country, their temple, and their former condition. (See *CYRUS.*) Astyages, after a reign of 35 years, was succeeded by his son Cyaxares, uncle to Cyrus, 560 B.C. Whilst Cyaxares lived, Cyrus held the empire only in partnership with him, though he had entirely acquired it by his own valour; but as Cyrus was entrusted with the command of the army, and the whole management of affairs, he alone was regarded as the supreme governor of the empire. From

Josephus we learn, that Cyaxares, or Darius the Mede, with his ally, Cyrus, destroyed the kingdom of Babylon. After the reduction of Babylon, Cyaxares, in concert with Cyrus, settled the affairs of their new empire, and divided it into 120 provinces. The governors of these provinces were under the direction of three presidents, of whom Daniel was appointed the chief. (See DANIEL.) From this time Media became a province of Persia. See EMPIRE and PERSIA.

MEDIANA, in *Anatomy*, median, a name given to certain veins of the upper extremity. These are the median veins of the fore-arm, occupying the middle of the limb, between the radius and the ulna. These divide at the elbow into two chief trunks, of which one joins the basilic, and the other the cephalic vein of the arm: they are named respectively, vena mediana basilica, and v. m. cephalica. See VEIN.

MEDIANA, in *Geography*, a town of Spain, in Arragon; 12 miles S.E. of Saragossa.

MEDIANÆ, *Columnæ*, in Vitruvius, are the columns in the middle of a portico, whose intercolumniation is to be larger than those of the columns.

MEDIANTE, *Fr.*, in *Music*, is the string or sound which divides the fifth of a key into two thirds, the one major, and the other minor; and it is their relative position which determines the key. When the major third is the lowest, that is to say, between the mediant and key note, the key is major, or with a sharp third; when the major third is uppermost, and the minor at the bottom, the mode or key is minor, or with a flat third above the base.

MEDIASTINUM, in *Anatomy*, the partition which divides the chest into the right and left halves. See LUNG.

MEDIATE, or INTERMEDIATE, a term of relation to two extremes, applied to a third, which is in the middle between them. See MEAN and MEDIUM.

Substance is a genus with regard to man; but between the two there are other mediate genusses, as body and animal.

Mediate stands opposed to immediate: thus when we say that God and man concur to the production of man; God is the *mediate* cause, man the *immediate*.

MEDIATE *Mode*. See MODE.

MEDIATIO, *Lat.*, MEDIATION, *Fr.*, in *Canto Fermo*, implies the middle of a chant, or the sound which terminates the first part of a verse in the psalms. The punctuation of the psalms in the English psalter, where a colon is constantly placed in the middle of a verse, and frequently when the sense requires not so long a pause, expresses this mediatio, or breath-place, marked out for those who chaunt the psalms in the cathedral service.

MEDIATOR, in *Theology*, is an appellation which belongs in a peculiar, appropriate, and eminent sense, to Jesus Christ, the instructor and saviour of mankind; accordingly, as the doctrine of mediator between God and man is a matter of pure revelation, the New Testament expressly asserts that "there is one God, and one mediator between God and man, the man Christ Jesus," 1 Tim. ii. 5. Divines, however, have differed in their sentiments with respect to the nature and extent of this office, and the mode of its accomplishment. In a general view of this subject, it is argued by bishop Butler in his 'Analogy, &c.' that the whole analogy of nature removes all imagined presumption against the general notion of a mediator between God and man; so that, as the visible government which God exercises over the world, is carried on by the instrumentality and mediation of subordinate beings, there is no sort of objection against the general notion of a mediator, considered as a doctrine of Christianity, or as an appointment in this dispensation; since we find by experience, that God does appoint mediators to be the instruments

of good and evil to us, the instruments of his justice and mercy. He adds, that it is clearly contrary to all our notions of government, as well as to what is, in fact, the general constitution of nature, to suppose that doing well for the future should, in all cases, prevent all the judicial bad consequences of having done evil, or all the punishment annexed to disobedience. And though the efficacy of repentance itself alone, to prevent what mankind had rendered themselves obnoxious to, and recover what they had forfeited, is now insisted upon, in opposition to Christianity; yet, by the general prevalence of propitiatory sacrifices over the heathen world, this notion of repentance alone being sufficient to expiate guilt, appears to be contrary to the general sense of mankind. As there was, therefore, room for an interposition to avert the fatal consequences of vice, revelation affords us such representations of the compassion and goodness of God in the administration of the world, as to give us reason to expect such an interposition; and, moreover, it informs us, that an interposition of this kind has been mercifully provided, in order to prevent the destruction of the human kind. (See John, iii. 16.) As for the particular manner in which Christ interposed in the redemption of the world, or his office as mediator, in the largest sense, *between God and man*, it is, as the learned prelate conceives, thus represented to us in the scriptures: 1st. He was, by way of eminence, "the prophet that should come into the world" (John, vi. 14.) to declare the divine will. He published anew the law of nature, which men had corrupted, and the knowledge of which was, to a great degree, lost among them. He taught mankind, authoritatively, to "live soberly, righteously, and godlily in this present world," in expectation of the future judgment of God. He confirmed the truth of this moral system of nature, and gave us additional evidence of it; the evidence of testimony. He distinctly revealed the manner in which God would be worshipped, the efficacy of repentance, and the rewards and punishments of a future life. Thus he was a prophet in a sense in which no other ever was. To which is to be added, that he set us a perfect "example, that we should follow his steps." 2dly. He has a "kingdom which is not of this world." He founded a church, to be to mankind a standing memorial of religion, and invitation to it; which he promised to be with always, even to the end. He exercises an invisible government over it himself, and by his spirit; over that part of it which is militant here on earth, a government of discipline. (See Eph. iv. 12, 13.) Of this church, all persons scattered over the world, who live in obedience to his laws, are members. 3dly. Christ offered himself a propitiatory sacrifice, and made atonement for the sins of the world; which is mentioned last, in regard to what is objected against it. Sacrifices of expiation were commanded the Jews, and obtained amongst most other nations, from tradition, whose original probably was revelation. And they were continually repeated, both occasionally and at the returns of stated times: and made up great part of the external religion of mankind. "But now once in the end of the world Christ appeared to put away sin by the sacrifice of himself." (Heb. ix. 26.) And this sacrifice was, in the highest degree, and with the most extensive influence, of that efficacy for obtaining pardon of sin, which the heathens may be supposed to have thought their sacrifices to have been, and which the Jewish sacrifices really were in some degree, and with regard to some persons.

How and in what particular way it had this efficacy, there are not wanting persons who have endeavoured to explain: but we do not find that the scripture has explained it. We seem to be very much in the dark, concerning the manner in which the ancients understood atonement to be made, *i. e.* pardon

pardon to be obtained by sacrifices. And if the scripture has, as surely it has, left this matter of the satisfaction of Christ mysterious, left somewhat in it unrevealed, all conjectures about it must be, if not evidently absurd, yet at least uncertain. Nor has any one reason to complain for want of farther information, unless he can shew his claim to it.

Some have endeavoured to explain the efficacy of what Christ has done and suffered for us, beyond what the scripture has authorized; others, probably because they could not explain it, have been for taking it away, and confining his office as redeemer of the world to his instruction, example, and government of the church. Whereas the doctrine of the gospel appears to be; not only that he taught the efficacy of repentance, but rendered it of the efficacy which it is, by what he did and suffered for us: that he obtained for us the benefit of having our repentance accepted unto eternal life: not only that he revealed to sinners, that they were in a capacity of salvation, and how they might obtain it; but moreover that he put them into this capacity of salvation, by what he did and suffered for them; put us into a capacity of escaping future punishment, and obtaining future happiness. And it is our wisdom thankfully to accept the benefit, by performing the conditions upon which it is offered, on our part, without disputing how it was procured, on his.

Another writer, *viz.* Mr. Tomkins, in his treatise entitled "Jesus the Mediator between God and Man," seems to have entertained similar views with those of bishop Butler concerning the mediation of Christ. The scripture, says this writer, expressly gives Christ the title of mediator (the one mediator): this will be allowed even by those who understand it of his mediating on the part of God towards us, or of his being invested with a mediatorial kingdom, in consequence of which he dispenses the favours of God to men. But this, in the judgment of the author to whom we now refer, is merely half of what the scripture designs, when it calls Christ the mediator; for he supposes this office to include what he doth or hath done on our behalf towards God. The apostle, he thinks, evidently and directly refers to this (1 Tim. ii. 5.) when he adds, "who gave himself a ransom for us." If, then, it appears that Christ offered himself a sacrifice; that he makes intercession for us: that he is ordained for us an high-priest in things pertaining to God; and that we are required to come unto God by him under this character: if these, and the like, are in the plain literal sense the doctrine of the New Testament, none, he supposes, can make it matter of dispute, whether the title of mediator hath not respect to these things, as well as to his acting on the behalf of God towards us: in confirmation of which it may be observed, that the term itself seems to imply a transacting with each party on the behalf of the other; according to the language of the apostle "a mediator is not of one." The object of the author in the treatise which we have cited, is to lay before the reader the declarations of scripture on the subjects above stated; or to shew that they represent what it was appointed for Christ to do on our behalf, and consequently what he hath done, or now does for us, in order to our reconciliation with God. Another writer, after shewing that the general notion of a mediator is not at all repugnant to the most honourable sentiments we can entertain of the mercy of God, states the substance of what he conceives to be the true Christian doctrine of a mediator in the following terms: *viz.* "that our blessed Saviour was appointed by the supreme authority of heaven and earth, to *reconcile* apostate and rebellious men to their offended maker and sovereign, and to be the *distributor* of God's favour to mankind." He thinks, that there

are several probabilities that incline us to believe, that our blessed Lord never expressly assumed to himself the title of mediator, during the time of his public ministry upon earth, and that it never was ascribed to him, all else of his exaltation to regal dignity and power; and of course that the mediatorial character of Christ did not properly commence till after his resurrection, when he had all power committed to him, and was constituted the *one Lord*, through whom are all things. Adverting to the death of Christ, as a prominent event in his history, he observes, that it was not intended to render the Deity propitious *i. e.* willing to be reconciled to his creatures upon fit and honourable terms, because it was proposed by *himself*, and the whole use and efficacy of it sprung from his appointing and declaring it to be an accepted sacrifice, so that it must necessarily suppose him to have been antecedently propitious. The truth of the case in his opinion seems to be, that it was "an expedient originally proceeding from the mercy of God, and not the argument or motive, inducing him to be merciful." The great purposes, as this author states them, which are evidently served by the express command of God to consider the death of Christ under the notion and character of a sacrifice, are those which follow.

First, that it might be a standing memorial of God's being propitious, and inclined to pardon the sins of men; and an enforcement of that fundamental principle of all religion, that he is a rewarder of them that diligently seek him: "A memorial coinciding with the almost universal sentiment and practice of the world (among whom sacrifices were esteemed as an essential part of religion), and likely, upon that account, to have a more certain and powerful influence."—Secondly, that it might be a standing memorial, likewise, of the evil and demerit of sin; and, consequently, a perpetual incentive to humility and repentance.—And, thirdly, it seems to have been wisely appointed with this view likewise, *viz.* to supersede the use of all future sacrifices; which, extending even to human sacrifices, had been the most depraved and unnatural branch of heathen superstition. And, therefore, that it might the better produce this effect, which was worthy the care of infinite wisdom and goodness, we are expressly informed, that Jesus Christ hath, by one offering, "perfected for ever them that are sanctified." Heb. x. 14.

And, in the last place, "there is formed, by this constitution, a beautiful analogy in a very considerable and important point, between the settled methods of God's natural providence, and the extraordinary operations of his grace;" which perhaps may justly be esteemed as one of the principal reasons of it. Foster's Sermons, vol. iv. serm. xvi. See ATONEMENT.

MEDIATORS of Questions, in our *Old Writers*, were six persons authorized by statute, who, upon any question arising among merchants, relating to any unmercable wool, or undue packing, &c. might, before the mayor, or officers of the staple, upon their oath, certify and settle the same; to whose order and determination therein, the parties concerned were to give entire credence, and submit. 27 Ed. III. stat. 2. c. 24.

MEDIATORS, *Μεταφοροι*, under the emperors of Constantinople, officers of state, who had the direction of all affairs transacted at court. Their chief, or president, was called *megas mesazon*, *μεγα: μεζων*, and answered to the prime or grand vizier of the Turks. H. 4m. Lex. in voc.

MEDICA, in *Botany*, an old name for some plants of the Trefoil or Lucerne family, which Tournefort has retained for the genus *Medicago* of Linnæus. It is supposed to be derived from Media, the native country of the plants to which it was applied. See MEDICAGO.

MEDICA is also the Linnæan specific name of the Citron, *Malus medica*, or Median Apple, of the old writers. See CITRUS.

MEDICAGO, so called by Tournefort, from *Medica*, which is indeed the proper name of the plant, (under of Dioscorides), and arose from its having been introduced into Greece by the Medes, during the Persian war in the time of Darius Hytaspes. This name being restrained by Tournefort to a few species with a flat, not spiral, legume, he calls the very numerous ones in which that part is more or less convoluted, or spiral, *Medicago*, as resembling, or approaching to, his *Medica*. Both tribes are united under the above appellation by Linnæus. The original *Medica* of the ancients, which was a valuable fodder, or, in the modern phrase, *artificial grass*, is probably one of the genus; though we cannot determine which, and it may possibly be some *Trifolium*, or perhaps a *Trigonella*. Lucern, Medick, or Snail Trefoil. Linn. Gen. 389. Schreb. 510. Willd. Sp. Pl. v. 3. 1403. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 795. Ait. Hort. Kew. ed. 1. v. 3. 96. Juss. 356. Lamarck Illustr. t. 612. Gært. t. 155. (Cochleata; Riv. Tetrap. Irr. t. 88. Falcata; ibid. t. 84. 85. 87.)—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Char. *Cal.* Perianth inferior, of one leaf, straight, cylindrical, somewhat bell-shaped, divided about half way down into five pointed, nearly equal, segments. *Cor.* papilionaceous. Standard ovate, undivided, inflexed at its edges, the whole reflexed. Wings ovate-oblong, affixed to the appendages of the keel, cohering by their edges within it. Keel oblong, cloven, spreading, obtuse, bent down by the pistil, and divaricating from the standard. *Stam.* Filaments in two sets, united almost to the top; anthers small. *Pist.* Germen stalked, oblong, incurved, compressed, enfolded by the filaments, starting from the keel, and forcing back the standard, terminating in a short, awl-shaped, nearly straight, style; stigma terminal, minute. *Peric.* Legume compressed, long, inflexed. *Seeds* several, kidney-shaped or angular.

Obs. The *Cochleata* of Rivinus have a spirally convoluted legume; his *Falcata* a curved, or sickle-shaped one.

Ess. Ch. Legume compressed, spiral, forcing back the keel of the corolla from its standard.

The latest edition of Linnæus enumerates but ten species of *Medicago*, because he always confounded, under his *M. polymorpha*, a numerous tribe, which, though they generally accord very nearly in herbage, differ too widely and constantly in their fruit to be esteemed mere varieties of one species. Willdenow, following Gærtner, has distinguished them all, and has even added several new ones, making all together 37. He has perhaps gone too far, and the subject appears to demand revision, which we shall here attempt.—*Medicago virginica*, Linn. Sp. Pl. 1096, is supposed to be the same plant as *Hedysarum frutescens*, and is therefore omitted here. On this point however the Linnæan herbarium affords no information.

* *Legumes* *lunate*, somewhat twisted.

1. *M. arborca*. Tree Medick, or Moon Trefoil. Linn. Sp. Pl. 1096. (*Cytisus septimus cornutus*; Ger. em. 1305.)—Legumes *lunate*, entire at the margin. Stem arborescent.—Native of rocky places in various parts of Greece and the Archipelago, as well as about Naples, flowering in the early spring. It is with us a hardy green-house shrub. *Stem* bushy. *Leaves* ternate, on long stalks; their leaflets inversely heart-shaped, hoary and silky beneath, like all the stalks. *Flowers* in axillary, stalked heads, or very short clusters, of a full yellow. *Legume* reticulated, making

scarcely more than one complete turn.—This shrub has been shewn by M. Amoureux in the *Mem. de la Soc. d'Agriculture de Paris*, for 1787, part 2d, to be the real *Cytisus* of Virgil, celebrated by him for causing cows to yield abundance of milk, while its flowers are grateful to goats and to bees.

2. *M. radiata*. Radiated Medick. Gært. f. 5. (*Lunaria radiata italorum*; Lob. Ic. v. 2. 38. *Trifolium filiquâ lunatâ*; Ger. em. 1207.)—Legume kidney-shaped, toothed at the edge. Leaves ternate.—Native of Italy. *Root* annual. *Stem* erect, more or less branched from the bottom, a span high. *Leaves* stalked, ternate, obovate, sharply toothed, somewhat hairy. *Flowers* small, yellow, two or three on each axillary stalk. *Calyx* hairy. *Legumes* singularly elegant, curved into an orbicular flat form, near an inch broad, naked, glaucous, purplish, finely reticulated, fringed with bristly teeth. *Seeds* numerous, transversely corrugated.

3. *M. circinata*. Pinnate Kidney Medick. Linn. Sp. Pl. 1096. (*Falcata foliis anthyllidis*; Riv. Tetrap. Irr. t. 87.)—Legume kidney-shaped, toothed at the edge. Leaves pinnate, lyrate, entire.—Native of Spain, Italy, and the Levant. Annual. *Leaves* somewhat like those of *Anthyllis vulneraria*, pinnate, with obovate, entire, thick, hairy leaflets, the odd one very large. The earliest leaves are simple. *Flowers* yellow, two or three on a long bracteated axillary stalk, like those of a *Lotus*. *Legume* smaller and less elegant than in the last, hairy. Willdenow and Gærtner describe a variety whose legume is smaller, without teeth, which may well prove a species. We have never seen it.

4. *M. sativa*. Lucern, or Purple Medick. Linn. Sp. Pl. 1096. Mart. Ruft. t. 48. Engl. Bot. t. 1749. (*Medica legitima*; Clus. Hist. v. 2. 242.)—Flower-stalks racemose. Legumes contorted. Stem erect, smooth.—In dry pastures and by road sides in France and Spain, as well as occasionally in England, but it is hardly wild with us. For its description, and agricultural use, see LUCERN. The legume is frequently so much convoluted, that it rather belongs to the next section.

5. *M. falcata*. Yellow Sickle-podded Medick. Linn. Sp. Pl. 1096. Mart. Ruft. t. 86, 87. Engl. Bot. t. 1016.—Flower-stalks racemose. Legumes moon-shaped. Stem procumbent.—Found in dry gravelly places in various parts of Europe. In England chiefly about Norwich and Bury. It greatly resembles the last, but does not grow erect, and the legume is merely sickle-shaped, not contorted. The flowers vary from yellow to purple, and are often of a green hue, combined of both the former tints. These two last species are perennial, and perhaps nearest akin to the first, *arborca*.

6. *M. glutinosa*. Clammy Medick. Willd. Sp. Pl. v. 3. 1406.—Flower-stalks racemose. Legumes falcate, twisted, hairy and viscid, like the calyx. Leaflets obovate, toothed at the summit.—Native of grassy land in Gauria. Willdenow says it is very similar to *M. falcata*, but differs in having obovate leaflets, and a hairy viscid calyx. The stems are ascending, and downy.

7. *M. lupulina*. Black Medick, or Nonefuch. Linn. Sp. Pl. 1097. Curt. Lond. fasc. 2. t. 57. Engl. Bot. t. 971. Mart. Ruft. t. 19. (*Trifolium luteum lupulinum*; Ger. em. 1186.)—Spikes ovate. Legumes kidney-shaped, rugged and veiny, single-seeded. Stem procumbent.—Frequent in the meadows and pastures of Europe. It is annual, flowering all summer long, and is much cultivated, as an artificial grass, for a crop of hay, or as fodder for sheep. The stems spread widely. The leaflets are broad, roundish-obovate, finely toothed. *Flowers* yellow, small, in dense ovate stalked spikes, very much resembling some of the common yellow species

species of *Trifolium*, with which indeed the whole habit of the plant accords, but the curved, black, rugged *legumes*, as they ripen, conspicuously distinguish it.

8. *M. obscura* Doubtful Medick. Retz. Obf. fasc. 1. 25. t. 1.—Flower-stalks racemose. Legumes kidney-shaped, with two seeds. Stipulas toothed. Leaflets obovate, somewhat rhomboid. Stems recumbent.—Supposed by Retzius, who had it by accident with other seeds, to be a native of Germany. Root annual. The habit and flowers are like many of the next section, but the *legume* is merely orbicular, not cochleated, or truly spiral; its diameter scarcely a quarter of an inch.

** *Legumes spirally convoluted*

9. *M. prostrata*. Slender Prostrate Medick. Linn. Suppl. 340. Jacq. Hort. Vind. v. 1. 39. t. 89. Ehrh. Pl. Select. 49.—Flower-stalks racemose. Stem procumbent, thread-shaped, much branched. Legumes thrice convoluted, thick-edged, without prickles. Stipulas bristle-shaped, undivided. Leaflets nearly linear.—Native of exposed stony ground in Hungary and Italy. It is known by its long, slender, much branched stems, simple stipulas, very narrow leaflets toothed merely at the point, and small orbicular *legumes*, consisting of two or three complete spiral turns, thick at the edge, destitute of teeth or prickles, and very slightly downy. The flowers are yellow, and, like the rest of the plant, vary much in size according to the richness of the soil. The root is perennial, in which it differs from most of this second section, and agrees with *sativa* and *fuleata*, which also it approaches in habit; but the whole nature of the *legume* has induced us to remove it hither.

10. *M. orbicularis*. Flat Snail Medick. (*M. polymorpha orbicularis*; Linn. Sp. Pl. 1097. Cochleata fructu orbiculato; Riv. Tetr. Irr. t. 88. f. 1.—Morif. sect. 2. t. 15. f. 1, 2.)—Stalks one or two-flowered. Stipulas in many capillary segments. Legumes orbicular, depressed, with radiating veins, and no teeth.—Native of fields in the south of Europe. Annual. Stems long and prostrate, angular, slender, smooth. Leaflets obovate, sharply toothed, smooth. Stipulas deeply pinnatifid. Flowers very small, yellow, on slender axillary stalks. Legumes smooth, orbicular, depressed, above three quarters of an inch in diameter, singularly neat, marked with elevated radiating veins, and of a glaucous or purplish hue. This is one of those hardy annuals, cultivated in curious gardens, by the name of *Snails*, the *Scorpiurus vermiculata* generally accompanying them under the appellation of *Caterpillars*, which its legumes strikingly resemble.

11. *M. rugosa*. Rugged Snail Medick. Lamarck Dict. v. 3. 632. (*M. elegans*; Willd. Sp. Pl. v. 3. 1408. Cochleata fructu rugoso; Riv. t. 88. f. 5. Morif. sect. 2. t. 15. f. 4.)—Stalks about two-flowered. Stipulas toothed. Legumes orbicular, depressed, with radiating elevated veins, a thick edge, and no teeth.—Native of Sicily. We have seen no specimen of this, but it should seem to be only a slight variety of the last, except the stipulas may serve to distinguish them.

12. *M. scutellata*. Common Snail Medick. Lamarck Dict. v. 3. 633. (*M. polymorpha scutellata*; Linn. Sp. Pl. 1097. Cochleata fructu scutellato; Riv. t. 88. f. 2. t. 89. f. 1. Morif. sect. 2. t. 15. f. 3.)—Stalks about two-flowered. Stipulas half arrow-shaped, toothed. Legumes globular, spiral, convex beneath, the convolutions erect, rugose, without teeth.—Frequent in corn fields in the south of Europe, and the most common kind in our gardens. It differs specifically from *M. orbicularis* in having broad stipulas, often strongly toothed, but not divided into deep capil-

lary segments. The *legume* moreover differs widely in being globose, in consequence of the edges of its convolutions being turned upwards, or erect, and they may be pulled asunder like a rolled slip of paper. The whole herb is more or less downy.

13. *M. Helix*. Small Snail Medick. Willd. Sp. Pl. v. 3. 1409. (*M. lavis*; Desfont. Atlant. v. 2. 213.)—Stalks many-flowered. Stipulas strongly toothed. Legumes orbicular, flat, of two spiral distant turns, concentrically veined, without spines.—We have from the south of France what answers well to Willdenow's description, nor have we the least doubt concerning the synonym of Desfontaines. The leaflets are obovate, rounded, with shallow teeth. Stipulas much like the last. Flowers four or five on a stalk. Legumes hairy, a quarter of an inch only in diameter, marked with concentric or spiral interbranching veins, in which respect it differs essentially from the three last, as well as from *M. obscura*, to which Willdenow compares it; a character which seems to have been noted by Desfontaines.

14. *M. tornata*. Screw-turned Snail Medick. Willd. Sp. Pl. v. 3. 1409. (*M. polymorpha tornata*; Linn. Sp. Pl. 1098. Herb. Linn. Cochleata fructu tornatili; Riv. t. 88. f. 4.)—Stalks many-flowered. Stipulas deeply toothed. Legumes cylindrical, flat at each end, of many, rather distant, horizontal, smooth, thin-edged turns, without spines.—Native of the south of Europe. The only specimen we have ever seen is that of Linnæus, who by quoting a figure of Morifou which belongs to the following, has led some botanists astray. Lachenal took one for the other, and Desfontaines has confounded the two. Whether they are more than varieties may perhaps be doubted, as is the case with some others of the genus; but they appear distinct. The real *tornata*, figured by Rivinus in that curious tab. 88, which is wanting in many copies of his book, has a small *legume*, that appears to be neatly turned, exactly like a screw, the convolutions being flat and horizontal, rather distant, with a thin smooth even edge, parallel and near to which runs a principal concentric spiral rib or nerve, connected by reticulated veins with the centre, and sending off a minute branch, here and there, to the margin. The stipulas have generally a few deep taper-pointed teeth. The flowers are rather large, four or five on a stalk. Leaves sharply toothed.

15. *M. turbinata*. Close-turned Snail Medick. Willd. Sp. Pl. v. 3. 1409. (*M. polymorpha turbinata*; Linn. Sp. Pl. 1098. Cochleata fructu turbinato; Riv. t. 88. f. 3. Morif. sect. 2. t. 15. f. 5.)—Stalks many-flowered. Stipulas deeply toothed. Legumes ovate, convex at each end, of many, closely imbricated, thick-edged, even turns, without spines.—Native of Italy and the south of France. Like the last in habit and general characters, but the *legume* is twice as large, ovate, its convolutions crowded close together, as if imbricated upwards, presenting a thick edge outwards, along which runs the same spiral concentric nerve which in the *M. tornata* is situated within the margin. Willdenow, who appears to have paid great attention to these plants, has removed a synonym of J. Bauhin, cited here by Linnæus, to the following, to which it evidently belongs. Linnæus indeed confounded the two, and Lachenal, led perhaps by Bauhin's synonym, took the *tuberculata* for *turbinata*. We cannot however follow Willdenow in here quoting Bauhin's *Medica scutellata*, v. 2. 384, which appears to us the real *Medicago scutellata*, our n. 12.

16. *M. tuberculata*. Warty Snail Medick. Willd. Sp. Pl. v. 3. 1410. (*M. polymorpha tuberculata*; Retz. Obf. fasc. 2. 23. *Medica magna turbinata*; Bauh. Hist. v. 2. 385. Cochleata fructu verrucoso; Riv. t. 88. f. 6. Morif. sect. 2. t. 15. f. 6.)—Stalks about two-flowered. Stipulas

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deeply toothed. Legumes nearly cylindrical, flattish at each end, of many horizontal crowded turns, beset with a double row of corrugated warts.—Native of the south of Europe. This differs from the last in having only one or two *flowers* on each stalk, which seems to be constant, and in the rather smaller, more cylindrical, *legumes*, the outer edge of whose convolutions is closely beset with a double row of bluntish warts, imbedded in a sort of granulated skin. In an early state these warts are rather bluntish spines.

17. *M. aculeata*. Prickly Snail Medick. Willd. Sp. Pl. v. 3. 1410. (Cochleata fructu turbinato et echinato; Riv. t. 88. f. 7?)—"Stalks about two-flowered. Stipulas toothed. Leaflets somewhat rhomboid. Legumes cylindrical, flattish at each end, of many turns, beset with thick short marginal spines."—Native country unknown. Willdenow describes it as very like the preceding, but distinct, the *legumes* being beset with unequal, thick, and very short, prickles. Not having seen this plant, we quote with doubt the figure of Rivinus, which answers pretty well to the description. Willdenow seems not to have known this tab. 88.

18. *M. Murex*. Thorny Snail Medick. Willd. Sp. Pl. v. 3. 1410. (Cochleata fructu durius echinato; Riv. t. 88. f. 10?)—"Stalks about two-flowered. Stipulas deeply toothed, or fringed. Leaflets obovate. Legumes cylindrical, rather convex at each end, of many turns, beset with straight thorns."—Native country unknown, but Willdenow had the plant alive, as well as the last. He describes it with cylindrical turbinate legumes, beset with thick awl-shaped thorns, and differing from the last in having obovate obtuse *leaflets*, the lower ones *obcordate*; linear-awl-shaped *stipulas* with fringe-like teeth, not lanceolate ones toothed only at the base; and longer thorns upon the fruit. We quote Rivinus with doubt, for the same reason as before, though we have scarcely any hesitation about either of his figures.

19. *M. intertexta*. Entangled Prickly Medick. Willd. Sp. Pl. v. 3. 1411. (M. polymorpha intertexta; Linn. Sp. Pl. 1098. Cochleata fructu echinato maximo; Riv. t. 88. f. 9; and t. 90. Morif. sect. 2. t. 15. f. 7, 8, 9.)—"Stalks about two-flowered. Stipulas deeply toothed. Legumes oval, of many turns, beset with two rows of long, awl-shaped, close-pressed thorns, alternately divaricated.—Native of the south of Europe. Distinguished from all the foregoing by its nearly globular *legumes*, about the size of a gooseberry, composed of six or seven close convolutions, concealed by the long sharp thorns, which cover the whole fruit, and which being alternately depressed, in two opposite directions, appear matted together. In all our specimens these thorns are smooth; Willdenow describes them as pubescent. The *flowers* are from two to four on each stalk. *Stipulas* fringed with long sharp teeth. *Leaflets* obovate, or somewhat rhomboid, narrow, sharply toothed. This species is often met with in gardens.

20. *M. ciliaris*. Hairy Prickly Medick. Willd. Sp. Pl. 1411. (M. polymorpha ciliaris; Linn. Sp. Pl. 1099. Cochleata fructu echinato rotundo; Riv. t. 88. f. 8.)—"Stalks about two-flowered. Stipulas deeply toothed. Legumes oval, of many turns, beset with two rows of short awl-shaped hairy thorns, spreading in two directions.—"Native of the south of France." Willdenow. Sent from Sicily by Mr. Bivona Bernardi. In habit and size it altogether agrees with the last; but the *legumes* are covered with much shorter hairy thorns, ranged in two rows along the edge of their convolutions, spreading in opposite directions, but not depressed.

21. *M. carstiensis*. Creeping-rooted Medick. Jacq. Coll. v. 1. 86. Ic. Rar. t. 156. Curt. Mag. t. 909.—Stalks many-flowered. Leaflets ovate. Stem erect. Root creeping. Legumes depressed, of many turns, fringed with two rows of straight spreading bristles.—Native of the alps of Carinthia and Carniola, said to have been introduced into our gardens in 1790. It is remarkable for its perennial creeping root, and upright, square, almost shrubby stem. The *leaflets* moreover are ovate, not obovate. *Flowers* six or eight on each stalk, of a bright yellow, their standard streaked with red. *Legumes* black, not half the size of the two preceding, of fewer turns, and depressed, the edges fringed with two divaricated rows of long bristles.

22. *M. maculata*. Spotted Medick. Sibth. Oxon. 232. Willd. Sp. Pl. v. 3. 1412. (M. polymorpha arabica; Linn. Sp. Pl. 1098. Fl. Brit. 797. Engl. Bot. t. 1616. Curt. Lond. fasc. 3. t. 47. Mart. Ruft. t. 76. Cochleata fructu longius echinato; Riv. t. 88. f. 12. Morif. sect. 2. t. 15. f. 12?)—"Stalks two or three-flowered. Leaflets inversely heart-shaped, spotted. Stipulas dilated, sharply toothed. Legumes depressed, their convolutions fringed with numerous, long, spreading bristles.—Native of the more temperate countries of Europe. Found in the south of England, on a gravelly soil, flowering in May and June. The stems are prostrate. Root annual. Leaflets distinguished by their obcordate shape, and a black or purplish spot in the middle of their disk, which however disappears from the later or upper leaves. *Stipulas* half-heart-shaped, with sharp broad teeth. *Flowers* two or three on a stalk, yellow, as indeed are all of this section of the genus. *Legumes* small, depressed, of several turns, marked with concentric nearly parallel ribs, and fringed with long, spreading, slender, and rather weak spines, or bristles, the whole pale brown or whitish when ripe.—The three varieties enumerated in the Flora Britannica are now esteemed distinct species, at least the β and γ . The δ we know only by the report of Dillenius.

23. *M. truncatula*. Abrupt Medick. Gærtn. v. 2. 350. t. 155. Morif. sect. 2. t. 15. f. 17. (M. tentaculata, by mistake; Willd. Sp. Pl. v. 3. 1413.)—"Stalks about two-flowered. Stipulas toothed. Legumes cylindrical, spiral, flat at each end, beset with two ranks of smooth, lanceolate, close-pressed prickles.—Native of the south of Europe. Willdenow had it living, and describes the *leaflets* as obovate; *stipulas* awl-shaped and toothed; *stalks* two-flowered; *legumes* as above. We should think it a variety of the following, but not having seen it, we dare not decide.

24. *M. coronata*. Coronet Medick. Lamarck Dict. v. 3. 634. Willd. Sp. Pl. v. 3. 1413. (M. polymorpha coronata; Linn. Sp. Pl. 1098. Morif. sect. 2. t. 15. f. 16. Medica coronata cherleri parva; Bauh. Hist. v. 2. 386.)—"Stalks many-flowered. Leaflets inversely heart-shaped. Legumes cylindrical, hairy, flat at each end, of about two turns, bordered with an ascending and descending row of strong, close-pressed, awl-shaped spines.—Native of the south of France. We have it from Gerard. This is a very small species, about three or four inches high, hardly branched; with lanceolate ribbed *stipulas*, scarcely toothed except at the base; several small *flowers* on each stalk; and curious little *legumes*, well represented in the figures quoted. The *leaflets* are hairy, obcordate, strongly toothed.

25. *M. apiculata*. Wheel-toothed Medick. Willd. Sp. Pl. v. 3. 1414. (M. coronata; Gærtn. v. 2. 349. t. 155. Morif. sect. 2. t. 15. f. 14?)—"Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes depressed, of three turns, strongly reticulated, with two rows of minute, diverging, marginal teeth.—Native of the south

south of Europe. We have it from Professor Lachenal under the name of *M. coronata*, but it is very distinct from the last, being a much larger plant, with deeply fringed stipulas, obovate smooth leaflets, and flattened strongly reticulated legumes, whose teeth are scarcely more prominent than their veins.

26. *M. denticulata*. Sickle-toothed Medick. Willd. Sp. Pl. v. 3. 1414.—“Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes depressed, of two turns, reticulated, with two rows of diverging marginal spines.”—Native of the south of Europe. Very near the last, differing only in its longer brittle-like marginal spines. Willd. We have from the sea-coast near Cley, in Norfolk, what seems to answer to these characters, except that in ours the leaflets are inversely heart-shaped. We know not whether this has been noticed as a British plant, or whether it be the *M. polymorpha* ♂ of Fl. Brit. adopted there from Dillenius.

27. *M. muricata*. Flat-toothed Medick. Willd. Sp. Pl. v. 3. 1414. (*M. polymorpha muricata*; Linn. Sp. Pl. 1098. Fl. Brit. 798 ♀. Morif. sect. 2. t. 15. f. 11. Trifolium cochleatum, modiolis spinosis; Pluk. Phyt. t. 113. f. 6.)—Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate, somewhat rhomboid. Legumes depressed, of five turns, with short, depressed, radiating teeth.—Native of dry ground in France and Italy. Said by Ray to have been found on the sea bank at Orford, Suffolk. The structure of its legume is abundantly different from the foregoing five species, the teeth being horizontal, and in single rows, nor is the surface veiny or reticulated. The leaflets are hairy. Flowers from two to four on each stalk.

28. *M. Gerardi*. Gerardian Medick. Willd. Sp. Pl. v. 3. 1415. Waldst. and Kitaib. Hungar. Morif. sect. 2. t. 15. f. 18.—“Stalks about two-flowered. Stipulas with setaceous teeth. Leaflets obovate. Legumes hairy, depressed, of five turns, with awl-shaped, projecting, hooked spines.”—Native of Spain, Narbonne, and Hungary.—We know it only from Willdenow, who had dried specimens before him.

29. *M. recta*. Upright Dwarf Medick. Willd. Sp. Pl. v. 3. 1415. (*M. polymorpha recta*; Desfont. Atlant. v. 2. 212.)—Stalks single-flowered. Stipulas entire. Leaflets wedge-shaped, downy. Stem erect. Legumes spiral, with hooked teeth.—Native of Barbary. About four inches high, annual, downy and silky. Leaflets small, with minute teeth. Stipulas ovate, acute. Flowers axillary, on very short stalks. Legume orbicular.

30. *M. marina*. Downy Sea Medick. Linn. Sp. Pl. 1097. Willd. Sp. Pl. v. 3. 1415. Cavan. Ic. v. 2. 26. t. 130. (Cochleata incana; Riv. t. 91. f. 2. t. 88. f. 15.)—Stalks many-flowered. Herb procumbent, very downy. Leaflets obovate, crenate or entire. Stipulas undivided. Legumes very hairy, with strong radiating teeth.—Native of the sandy sea-coast in the north of Africa, and south of Europe. Root perennial. Stems prostrate, much branched, densely clothed with soft hoary hairs, as is every part of the herbage. The leaflets are wedge-shaped, broad, but scarcely obovate, either quite entire, or slightly crenate at the end only. Flowers numerous, of a full yellow, in dense round heads. Legumes with several convolutions, edged with prominent, awl-shaped, strong hairy teeth.—This can be confounded with no other, and even Linnæus keeps it separate from the varieties of his supposed species *polymorpha*.

31. *M. Terebellum*. Prickly Screw Medick. Willd. Sp. Pl. v. 3. 1416. (*M. aculeata*; Gært. v. 2. 349. t. 155. Morif. sect. 2. t. 15. f. 20, 21. Cochleata fructu rarius

echinato; Riv. t. 88. f. 11?) Stalks with several flowers. Stipulas deeply toothed. Leaflets obovate, obtuse. Legumes cylindrical, flat at each end, of five turns, with two rows of diverging, very short, awl-shaped spines.—Native of the south of Europe. In habit this is among the more luxuriant procumbent species. The leaflets are broad, strongly toothed; the lower ones most abrupt. Spines of the legumes, thick at the base, often conical, reflexed in opposite directions. The ripe legume is the size of a large pea. Hence we rather cite Rivinus's fig. 7 for our 17th species, *M. aculeata*, than, with Gærtner, for the present, that figure being nearly thrice as large.

32. *M. tribuloides*. Caltrop Medick. Lamarck Dict. v. 3. 635. Willd. Sp. Pl. v. 3. 1416.—“Stalks two-flowered. Stipulas toothed. Leaflets obovate. Legumes cylindrical, flat at each end, of five turns, with two rows of diverging conical spines.”—Native of the south of Europe. Willdenow says the legumes are very like those of his *tentaculata*, our *truncatula*, n. 23, but larger, with longer spines, which are merely reflexed, not close-pressed. We have seen no specimen that answers to this. Willdenow had it alive.

33. *M. uncinata*. Larger Bur Medick. Willd. Sp. Pl. v. 3. 1417.—Stalks many-flowered. Stipulas toothed. Leaflets obovate. Legumes cylindrical, short, flat at each end, of several distant turns, with two spreading rows of long, awl-shaped, hooked spines.—Willdenow, who had this also alive, supposes it a native of the south of Europe. We find what answers very correctly to his description in the Linnæan herbarium, marked *coronata*, which is most assuredly an error. Linnæus having referred all this tribe to one species, was not sufficiently attentive to their differences, even as varieties. The legumes of the present are nearly globose, loosely spiral, and distinguished by their hooked prickles from nearly all the foregoing, in which mark they agree with two hereafter described, *minima* and *nigra*.

34. *M. rigidula*. Bristly Medick. Willd. Sp. Pl. v. 3. 1417. (*M. polymorpha rigidula*; Linn. Sp. Pl. 1098. Medica fructu cochleato spinoso; Ger. em. 1199. Cochleata fructu echinato rotundo minore; Riv. t. 88. f. 13?) Stalks with several flowers. Stipulas toothed. Leaflets obovate. Legumes cylindrical, of many turns, with conical straight spreading spines.—Native of fields in France, Italy, and Barbary.—This differs from the last in having the convolutions of the legume closer, the spines straight, all horizontally spreading; the flowers twice as large. It is difficult to adjust the synonyms of all these species. The figure of Gerard, which is also found in Lobel's Icones, v. 2. 37. f. 1, may have been done for either, but it best agrees with this. We are much in doubt concerning Rivinus's f. 13; but we cannot refer his f. 12 to the present species, because that figure so admirably and precisely represents the concentric veins of *M. maculata*, n. 22, which being a common plant, could hardly have been unknown to Rivinus.

35. *M. minima*. Little Bur Medick. Willd. Sp. Pl. v. 3. 1418. (*M. polymorpha minima*; Linn. Sp. Pl. 1099. Fl. Brit. 798 ♀. Fl. Dan. t. 211. Medica echinata minima; Bauh. Hist. v. 2. 386. Cochleata fructu echinato minimo; Riv. t. 88. f. 14.)—Stalks many-flowered. Stipulas half-ovate, undivided. Leaflets obovate, hairy. Legumes orbicular, hairy, of three or four turns, with two divaricated rows of hooked spines.—Native of Germany, Hungary, Switzerland, France, and England, chiefly on a calcareous soil. Mr. Woodward found it at Narburgh, Norfolk. A small prostrate downy species; its leaflets strongly toothed at the very summit only. Flowers four or five on each stalk, with a hairy calyx. Legumes small, orbicular,

cular, distinguished by their numerous rigid, spreading, but strongly hooked, prickles.

β. *M. polymorpha hirsuta*. Linn. Sp. Pl. 1099. (*Medica echinata hirsuta*; Bauh. Hist. v. 2. 386.) This is said by Willdenow to be a variety, four times as large as the common *minima*, and less hairy. We know it not, but we have from Switzerland, intermixed with the common sort, a few specimens distinguished by the long spines of their fruit, hooked at the tip only. These require investigation in a living state. They may be Bauhin's plant.

36. *M. nigra*. Black Prickly Medick. Willd. Sp. Pl. v. 3. 1418. (*M. polymorpha nigra*; Linn. Syft. Veg. ed. 14. 694. *M. hispida*; Gært. v. 2. 349. t. 155. Morif. sect. 2. t. 15. f. 19.)—Stalks about two-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes cylindrical, rather depressed, of several close turns, with long, spreading, black, hook-tipped spines.—Native of the south of France. We have no specimen. It seems to be distinguished by the long black prickles of the fruit, whose points are said to be hooked, though no such character is shewn in the figures quoted. Gartner surely misapplies Rivinus's f. 12, in which, as we have observed under n. 34, the veins are concentric, not reticulated as Gartner represents them in his *hispida*.

37. *M. laciniata*. Jagged-leaved Medick. Willd. Sp. Pl. v. 3. 1419. (*M. polymorpha laciniata*; Linn. Sp. Pl. 1099. *Cochleata syriaca*; Riv. Tetr. Irr. t. 91. f. 1.)—Stalks about two-flowered. Stipulas fringed with capillary teeth. Leaflets linear-wedge-shaped, abrupt, cut. Legumes cylindrical, of many turns, with two rows of alternately divaricated, strong, hook-tipped spines.—Native of the south of Europe and north of Africa. This species is readily known by its narrow jagged leaflets. The stipulas are cut into deep capillary segments. Flowers one or two, on long slender stalks. Legumes cylindrical, somewhat elliptical, the size of a large pea, composed of about five close turns, armed with a double divaricated row of peculiarly strong, awl-shaped, smooth, polished spines, very minutely hooked at their tips only.

It is proper to observe that all the species of this second section have yellow flowers on axillary stalks; the stem, where not described otherwise, prostrate, branched from the root, which is generally annual. The leaflets are always more or less toothed. In quoting Morison throughout this article, we have not thought it worth while to copy his long names or definitions, but merely to cite his figures. Many of these remain still unappropriated, for want of better descriptions. S.

MEDICAGO, in Gardening, furnishes plants of the shrubby evergreen and herbaceous annual kinds, of which the species mostly cultivated are, the tree medick, or moon trefoil (*M. arborea*); and the variable medick, or snail and hedge-hog trefoil (*M. polymorpha*.)

The second sort has numerous varieties and subvarieties, but the principal ones are, the common snail medicago, with large smooth pods, shaped and twisted like a snail; the hedge-hog medicago, with large prickly snail-shaped pods, armed with spines pointing every way, like a hedge-hog; with turbinated pods; with globular pods; with orbicular pods; with long crooked pods; with double pods; with twisted pods; and with jagged leaves.

Method of Culture.—The first sort may be raised from seeds or cuttings.

In the former mode the seeds should be sown in the early spring, on a warm border, or in pots of light mould, and plunged in a moderate hot-bed, till the plants have attained a little growth; when they should be gradually hardened to

the full air. And in both methods the plants should be kept clean, and have protection in the following winter from frost, and in the spring they should be planted out, some into pots to have the management of green-house plants, and others into borders and nursery rows, in dry warm situations, the former to remain, and the latter to be occasionally transplanted.

But when they are increased by cuttings, these should be planted on a bed of light rich earth, or in pots of the same sort of mould, and plunged in a moderate hot-bed, due shade and water being given; and when they have formed good roots, in the autumn they may be removed into other pots, or the situations in which they are to remain, shading and watering them till they are well rooted, when they should be trained up to sticks, to have straight stems and regular heads, their irregular shoots being annually pruned to keep them in order. These plants are found to grow stronger and flower better when kept in warm situations in the open air, than when managed as green-house plants. They should, however, be sheltered in very severe winters.

And the second sort and varieties may, also be raised from seed, which should be sown in the early spring months in the places where the plants are to remain, in patches of several seeds, after thinning the plants to two or three of the best, when they require no further culture. It is the double sorts that are chiefly cultivated in the garden.

They both afford variety in the borders and other parts, and the former in the green-house among other similar plants.

MEDICAL ELECTRICITY. It is natural to imagine, that a power of such efficacy as that of electricity, would be applied to medical purposes; especially since it has been found invariably to increase the insensible perspiration, to quicken the circulation of the blood, and to promote the glandular secretion. Accordingly, many instances occur in the later period of the history of this science, in which it has been tried, on various occasions, with considerable advantage and success. Among the variety of cases to which it has been applied, there are none in which it seems to have been prejudicial, except those of pregnancy and the venereal disease. In most disorders, in which it has been used with perseverance, it has given, at least, a temporary and partial relief, and in many effected a total cure. The first instance that occurs of its salutary effect, was that of a woman, who was cured in a quarter of an hour of a contracted finger, by M. Kratzenstein, at Halle, so early as the year 1744. It was afterwards applied in a variety of paralytic cases, by M. Jallabert of Geneva, in 1747; M. Sauvages of the academy in Montpellier, in the course of whose experiments it appeared, that electrification increases the circulation of the blood about one-sixth; Mr. Patrick Brydone in Scotland, in 1757; the abbé Nollet and others: in several of the cases concerned present relief was obtained; but the beneficial effect does not appear to have been permanent. One instance occurs, related by Dr. Hart of Shrewsbury, and recorded in the Phil. Trans. vol. xlviii. part ii. p. 785, in which electrification was injurious, and brought on universal palsy on a young person, whose right arm was paralytic; and though this palsy was removed by a course of medicine, the diseased arm remained incurable. It also appears from a number of experiments made by Dr. Franklin in paralytic cases, that no permanent advantage was derived from electricity in this disorder; and Mr. Wesley, who was long engaged in a course of medical electricity for the benefit of persons in his connection, observes, that though many paralytics have been helped by it, no palsy of a year's standing has been thoroughly cured by it. However, a remarkable instance more lately occurs, in which an hemiplegia was cured by this

MEDICAL ELECTRICITY.

this means, under the direction of a physician at Greenwich. The patient was in such a state, that boiling water might be applied from her hand to her shoulder, and from her shoulder to her foot, on the diseased side, without being felt. This person was electrified, by drawing sparks from the palsied side, and giving shocks, beginning with stronger shocks, till she began to feel them, and continuing moderate ones, for 18 days; and in that time, during 31½ hours, the number of shocks was 141; and this performance was attended with such success, that her feeling was quite restored, and that she became capable of walking, and of writing with the hand, the use of which she had lost. Dr. de Haen observes, that with respect to partial palsies, electrification never did the least harm; and that one or two persons, who had received no benefit from it in six entire months, were yet much relieved by persevering in the use of it; and that some persons discontinuing it, after having received some benefit from it, relapsed again; but afterwards, by recurring to the use of electricity, recovered, though more slowly than before.

Dr. Hart, in 1756, mentions a cure performed on a woman, whose hand and wrist had been for some time rendered useless, by a violent contraction of the muscles; but the most remarkable case of this kind is that related by Dr. Watson, *Phil. Trans.* vol. liii. p. 10.

The patient, about seven years of age, was seized with an universal rigidity of her muscles, so that her whole body felt more like that of a dead corpse than of a living person; Dr. Watson electrified her, at convenient intervals, from the middle of November 1762, to the end of January 1763, when every muscle of the body was perfectly flexible, and subservient to her will, so that she could stand, walk, and run like other children of her age. Mr. Miles Partington also communicated to the Royal Society a surprising instance of the cure of a very great degree of contraction and rigidity in the sterno-mastoideus muscle by means of electrical sparks and shocks. (*Phil. Trans.* vol. lxxviii. part i. p. 97, &c.) Mr. Wilson mentions a single instance, in which he had cured deafness of seventeen years continuance; but he acknowledges that he tried similar experiments on six other deaf persons without success.

Mr. Lovet and Mr. Wesley have extended the medical application of electricity to a greater variety of cases than any others. Mr. Lovet observes, in his "Essay," that electricity is almost a specific in all cases of violent pains, of however long continuance, in any part of the body; as in obstinate head-aches, the tooth-ache, the sciatica, the cramp, and disorders resembling the gout; and that it has seldom failed to cure rigidities, or a wasting of the muscles, and hysterical disorders; he adds, that it cures inflammations, and a fistula lachrymalis; that it has stopped a mortification, and dispersed extravasated blood; that it has been of excellent use in bringing to a suppuration, or in dispersing without suppuration, obstinate swellings of various kinds, even those that were serophulous; that it has cured the falling-sickness, and several kinds of fits, and a disorder that seems to have been a gutta serena. He advises to begin, in general, with simple electrification, especially in hysterical cases; then to proceed to take sparks, and lastly, to give moderate shocks. Mr. Wesley observes, that he has scarcely known an instance, in which shocks all over the body have failed to cure a tertian or quartan ague; he mentions cases of blindness cured and relieved by it, and hearing given by it to a person who was born deaf; and he further says, that it has cured bruises, running sores, the dropsy, and a palsy in the tongue; and that it has brought away gravel from the kidneys. In hysterical cases, he recommends the patient's being simply electrified, by sitting on cakes of resin, at least for half an

hour morning and evening; and then taking small sparks, and afterwards giving shocks, more or less strong as the disorder requires. Dr. Antonius de Haen, in his "Ratio Medendi," cited by Dr. Priestley (*Hist. Elect.* vol. i. p. 485, 8vo.), informs us, that a paralysis and trembling of the limbs, from whatever cause it arose, never failed to be relieved by electricity; and that it also certainly cures St. Vitus's dance; that it has been of some use in cases of deafness; but failed in its application to a gutta serena, and stromous neck. Mr. Hey, surgeon of Leeds, mentions several cases in which the power of electricity has been successfully applied to an "amaurosis." The machine was used twice a day; the patient was placed on a stool with glass legs, and had sparks drawn from the eyes and parts surrounding the orbit, especially where the superciliary and infra-orbitary branches of the fifth pair of nerves spread themselves. After this operation had been continued for half an hour, the patient was made to receive for an equal time slight shocks through the affected parts, which were sometimes directed across the head, from one of the temples to the other, but chiefly from the superciliary and infra-orbitary foramina to the occiput. *Med. Obs. & Enq.* vol. v. p. 1, &c.

In rheumatic cases, Mr. Ferguson observes, that he has generally found electricity successful, by continuing to take sparks from the places where the pain lies, till the skin has been red and pimpled, and the patient has felt a glowing warmth where the sparks were drawn off; and the same method has also proved effectual in old sprains. The use of electricity has also been recommended in cases of sudden death. See DROWNING.

In all cases where shocks are given, gentle ones should be first used: and if the disorder continues, they may be gradually increased; and they should be confined to the affected part. The efficacy of electricity in the tooth-ache is so great that it seldom or ever fails to give immediate relief, unless the tooth be very much decayed. The following instrument will serve for this purpose: it consists of two wires, A B and B E, fixed in the piece of bored wood H, and bent at C D and F G, and at A and B, as in *fig. 1, Plate XV., Electricity*. If the affected tooth be brought within the two wires at E, and the ring A or B be connected by a chain with the outside of a charged jar, and the other ring be connected by a chain with the knob of the jar, the shock will pass through the wires, and consequently through the tooth. The modes of applying electricity to the human frame, formerly used, were by the shock and spark, and sometimes, though rarely, by single electrification. These modes are now varied and multiplied according to the circumstances of the patient, and the nature of his disorder. Under the conduct of Mr. Birch, an eminent surgeon, who particularly directed his attention to the improvement and application of medical electricity, and of other gentlemen of the profession who have pursued the same course, the cases in which electricity may be employed with success have been ascertained, and its advantages evinced. For an account of this medical apparatus, and of various modes of applying it in different disorders, see Adams's *Essay on Electricity*, chap. 15, 8vo. 1785.

Dr. Cullen says, that electricity, when properly applied, is one of the most powerful stimulants that can be used to act upon the nervous system of animals. Mr. Birch considers electricity, applied under the form of a fluid, as a sedative, under that of a spark or friction, as a stimulant, and by way of a shock, as a deobstruent, in its action.

Under this head of medical electricity it may not be improper to mention those medicated tubes, the imaginary virtues of

of which were first discovered by Signior Pivati, at Venice, and which were much recommended in the years 1747 and 1748, both in Italy, and by Mr. Winkler at Leipsic. These gentlemen imagined, that odorous substances, confined in excited glass vessels, would transpire through the pores of the glass, and communicate their medicinal virtue to the atmosphere of a conductor, and to all persons in contact with it; and that these substances would yield their virtues by being held in the hands of persons electrified; and they pretended that many cures were wrought in this way by the operation of medicines, without being taken into the stomach; but the whole was soon discovered to be a fallacy; and it was incontestibly proved, that no effluvia could pass from the included substances through the pores of excited glass; and that no method was known for causing the power of medicine to insinuate itself into the human body by electricity. Dr. Franklin, by proving that glass was impermeable to the electric fluid itself, and that its electricity was collected from the rubber, &c. evinced the absurdity of every attempt to transmit the effluvia of any substance through the glass. See Franklin's Letters, p. 82, &c.

MEDICAL Stones. See STONE.

MEDICAMENTOSUS LAPIS. See LAPIS.

MEDICI, COSMO DE, in *Biography*, a citizen of Florence, born in that city in 1389, was the eldest son of John, or Giovanni de Medici, who laid the foundation of that greatness which his posterity enjoyed for several ages. By a strict attention to commerce, John acquired immense wealth; by his affability, moderation, and liberality he ensured the confidence and esteem of his fellow-citizens. Without seeking after the offices of the republic, he was honoured with them all. "The maxims," says Mr. Roscoe, "which, uniformly pursued, raised the house of Medici to the splendour which it afterwards enjoyed, are to be found in the charge given by this venerable old man on his death-bed to his two sons." These, on account of their excellence, of the authority by which they were enforced, and of the successful application of them by his posterity, we shall transcribe. "I feel," said he, "that I have lived the time prescribed me. I die content; leaving you, my sons, in affluence and in health, and in such a station, that while you follow my example, you may live in your native place honoured and respected. Nothing affords me more pleasure than the reflection that my conduct has not given offence to any one; but that, on the contrary, I have endeavoured to serve all persons to the best of my abilities. I advise you to do the same. With respect to the honours of the state, if you would live with security, accept only such as are bestowed on you by the laws, and the favour of your fellow-citizens; for it is the exercise of that power which is obtained by violence, and not of that which is voluntarily conferred, that occasions hatred and violence." At the death of this venerable man, in 1428, Cosmo had already attained to high respectability as well in the political as in the commercial world. He had engaged deeply, not only in the extensive commerce by which the family had acquired its wealth, but in the still weightier concerns of government. In the year 1414, when Balthasar Cossa, who had been elected pope, and had assumed the title of John XXIII., was summoned to attend the council of Constance, he chose to be accompanied by Cosmo de Medici, among other men of eminence, whose high characters might countenance his cause. On the death of his father, Cosmo succeeded to the influence possessed by him as head of that powerful family, which rendered him the first citizen of the state, though without any superiority of rank or title. He supported and augmented the family dignity. His conduct was uniformly

marked by urbanity and kindness to the superior ranks of his fellow-citizens, and by a constant attention to the interests and wants of the lower class of citizens, whom he relieved with unbounded generosity. By these means he acquired numerous and zealous partisans, whom he considered rather as pledges for the continuance of the power which he possessed, than as instruments to be employed in the ruin and subjugation of the state.

The authority which Cosmo and his descendants exercised in Florence during the 15th century consisted rather in a tacit influence on their part, and a voluntary acquiescence on that of the people, than in any prescribed or definite compact between them. The form of government was that of a republic, directed by a council of ten officers, and a chief executive officer, called the *Gonfaloniere*, or standard bearer, who was chosen every two months. Under this establishment, the citizens imagined they were possessed of the full exercise of their liberties; but such was the influence of the Medici, that they generally assumed to themselves the first offices of the state, or nominated such persons as they esteemed fit for those employments. In this, however, they always paid great respect to popular opinion. Notwithstanding the great prudence and moderation of Cosmo's public conduct, the discontent of the Florentines, with the bad success of the war against Lucca, gave occasion to the preponderance of a party led on by Rinaldo de' Albizi, which, in 1433, after filling the magistracies with their own creatures, seized the person of Cosmo, and proceeded judicially against him, on the pretence that his influence was hazardous to the state. He was committed to prison, in which he remained for several days, in constant apprehension of some violence being offered to his person; but he still more dreaded that the malice of his enemies might make attempts upon his life by poison. On the news of his danger, several princes and states of Italy interfered in his behalf; and in conclusion, he was banished to Padua for ten years, and several other members and friends of the Medici family underwent a similar punishment. He was received with marked respect by the Venetian government, and took up his abode in the city of Venice. Within a year of his retreat, Rinaldo was himself obliged to quit Florence, and Cosmo being recalled, he returned amidst the acclamations of his fellow-subjects. Some victims were offered to his future security, and the *gonfaloniere* who had pronounced his sentence, with a few others of that party, were put to death. Measures were now taken to restrict the choice of magistrates to the partisans of the Medici, and alliances were formed with the neighbouring powers for the avowed purpose of supporting and perpetuating the system by which Florence was from that time to be governed. The manner in which Cosmo employed his authority, has conferred upon his memory the greatest honour. From this time his life was an almost uninterrupted series of prosperity. The tranquillity enjoyed by the republic, and the satisfaction and peace of mind which he experienced in the esteem and confidence of his fellow citizens, enabled him to indulge his natural propensity to the promotion of science, and the patronage and encouragement of learned men. The richest private citizen in Europe, he surpassed almost all sovereign princes in the munificence with which he patronized literature and the fine arts. He assembled around him some of the most learned men of the age, who had begun to cultivate the Grecian language and philosophy. He established, at Florence, an academy expressly for the elucidation of the Platonic philosophy, at the head of which he placed the celebrated Marsilio Ficino. He collected from all parts, by means of foreign correspondences, manuscripts of the

Greek, Latin, and Oriental languages, which were the foundation of the Laurentian library. He gave great encouragement to the arts of painting, sculpture, and architecture, by the vast sums which he expended in the public edifices of the city, as well as in his private palaces. He also collected the valuable remains of ancient art in statues, vases, gems, and medals; and all his treasures were made liberally accessible to the curious.

Towards the latter period of his life, a great part of the time that Cosmo could withdraw from the administration of public affairs was passed at his seats at Careggi and Cassaggiolo, where he applied himself to the cultivation of his farms; but his happiest hours were devoted to the study of letters and philosophy, or passed in the company and conversation of learned men. In his country retreats he was usually accompanied by Ficino, where, after having been his protector, he became his pupil in the study of the Platonic philosophy. His attachment to the sentiments of antiquity did not render him indifferent to the religion of his country, and he displayed his piety according to the fashion of the age, by numerous religious foundations which he munificently endowed. He even erected a noble hospital at Jerusalem for the relief of distressed pilgrims. The spirit of his government was mildness and moderation. He never assumed a state beyond that of a citizen in a republic, and avoided every open exertion of authority which could lead the Florentines to suspect they had lost their liberties.

The wealth and influence that Cosmo had acquired, had long entitled him to rank with the most powerful princes of Italy, with whom he might have formed connections, by the intermarriage of his children; but being apprehensive that such measures would give rise to suspicions that he entertained designs inimical to the freedom of the state, he rather chose to increase his interest among the citizens of Florence, by the marriage of his children into the most distinguished families of that place. Piero, his eldest son, married Lucretia Tornabuoni, by whom he had two sons, Lorenzo, the subject of the following article, and Giuliano. Cosmo conversed freely with all orders of men, and there was scarcely a citizen whom he had not some time obliged by loans of money of which he never expected the repayment. His immense wealth was not the object of envy, because he chiefly expended it upon the public; so that it was a kind of common fund in which all had an interest. Parties were again formed in Florence hostile to the predominance of the Medici. The popularity of Cosmo, however, was not to be shaken, and while he withdrew from public business, he retained the influence of his benefits and virtues. He had lost his second son, Giovanni, on whom he had placed his chief expectations, as his eldest, Piero, laboured under various bodily infirmities, and he apprehended that at his own decease the splendour of his family would close. These reflections embittered the repose of his latter days: and he exclaimed, a short time before his death, as his attendants were carrying him through the apartments of his palace, "This is too large a house for so small a family." His latter days were, however, cheered by the honourable testimony to his merit, afforded by his fellow-citizens, in a public decree, conferring upon him the noble title of *Father of his Country*, which was inscribed on his tomb, and has ever since adhered to his name.

About three weeks before his death, when his strength began rapidly to decline, he entered into conversation with Ficino, lamenting the miseries of life, and the imperfections inseparable from human nature. As he continued his discourse, his sentiments and his views became more elevated, and from bewailing the lot of humanity, he began to exult

in the prospect of that happier state towards which he felt himself approaching. He died August 1st, 1464, at the age of seventy-five years, deeply lamented by a vast majority of the citizens of Florence, whom he had firmly attached to his interest, and who feared for the safety of the city from the dissensions that were likely to ensue. *Refoe's Life of Lorenzo.* Univer. Hist.

MEDICI, LORENZO DE, surnamed *The Magnificent*, grandson of Cosmo, and son of Piero de Medici, by Lucretia Tornabuoni, was born on January 1, 1448. He was about sixteen years of age when Cosmo died, and had, at that time, given striking indications of extraordinary talents. From his earliest years he had exhibited proofs of a retentive and vigorous mind, which had been cultivated by a very careful education, chiefly under the direction and good conduct of his mother Lucretia, who was one of the most accomplished women of the age, and who had distinguished herself not only as a patroness of learning, but by her own writings. The disposition of Lorenzo, which afterwards gave him a peculiar claim to the title of "Magnificent," was apparent in his childhood. Having received, as a present, a horse from Sicily, he sent the donor, in return, a gift of much greater value, and on being reproved for his profuseness, he remarked, that there was nothing more glorious than to overcome others in acts of generosity. In his youth he had the advantage of the instructions of some of the wisest and most learned men of the age, in the languages, and philosophy of antiquity, and the principles of polite literature. To the latter he displayed a decided inclination by some early poetical compositions in his native tongue; but he seemed formed for excelling in every thing that becomes an object of attention. He was not less addicted to active sports and laborious exercises, than to the studies of the closet, and was equally dextrous in the management of business, and in the pursuits of arts and science. Tall in his stature, robust in his form, Lorenzo had in his person more the appearance of strength than of elegance. From his birth he laboured under peculiar disadvantages; his sight was weak, his voice harsh and unpleasing, and he was totally deprived of the sense of smell. With all these defects, his countenance was dignified, and strongly indicated the magnanimity of his character; and the effects of his eloquence were conspicuous on many important occasions. At the death of Cosmo, on account of his father's infirmities, it was thought proper immediately to initiate Lorenzo into political life. He was, accordingly, sent to visit the principal courts of Italy for the purpose of forming a personal connection with the rulers, and making observations on the circumstances of each state. He strengthened the interests of his family in an interview with Ferdinand, king of Naples, who was impressed with a high idea of his early wisdom; and the prudence and vigour of his conduct at home were materially instrumental in restoring the superiority of the Medici. In 1469, Lorenzo married Clarice, the daughter of a member of the noble family of Orsini, and in the same year Piero de Medici died, leaving his two sons, Lorenzo and Giuliano, the heirs of his power and property. Immediately after the death of his father, Lorenzo, at the request of the people of Florence, took upon himself that post of head of the republic which Cosmo and Piero had occupied. Upon the accession of Sixtus IV. to the papacy, Lorenzo, with other eminent citizens, were deputed to congratulate him on the part of the Florentine republic. On this occasion he was invested with the office of treasurer of the holy see, and he took the opportunity of his abode at Rome to make valuable additions to the remains of ancient art already collected by his family. One

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of the first public occurrences after he conducted the helm of government was a revolt of the inhabitants of Volterra, on account of a dispute with the Florentine republic; by the recommendation of Lorenzo, means of force were adopted, which ended in the sack of the unfortunate city, an event that gave him much concern. In 1472, he was the means of re-establishing the academy of Pifa, and he took up his residence for a considerable time in that city for the purpose of completing the work; exerted himself in selecting the most eminent professors, and contributed to it a large sum from his private fortune, in addition to that granted by the state of Florence. Zealously attached to the Platonic philosophy, he took an active part in the establishment of an academy for its promotion, and instituted an annual festival in honour of the memory of Plato, which was conducted with singular literary splendour. While he was thus advancing in a career of prosperity and reputation, a tragical incident was very near depriving his country of his future services. This was the conspiracy of the Pazzi, a numerous and distinguished family in Florence, the rivals of the house of Medici. The instigators of this foul conspiracy, of which the object was the assassination of Lorenzo and his brother, were pope Sixtus IV. and his nephew, cardinal Riario: and the archbishop of Pifa, Salviati, was the principal agent in the horrid design. Giacomo de Pazzi, the head of that family, gave his name and assistance, and several persons of desperate character undertook to aid in the execution. Nothing could exceed the atrocity of the plan which was to assassinate the two brothers, while they were partaking of the hospitality of Lorenzo; but the absence of Giuliano, on account of indisposition, obliged the conspirators to postpone the attempt. Thus disappointed, another plan was to be adopted, and on further deliberation it was resolved that the assassination should take place on the following Sunday, in the church, at the instant of the elevation of the host.

The immediate assassination of Giuliano was committed to Francesco de Pazzi and Bernardo Bandini, and that of Lorenzo had been intrusted to the sole hand of Monteficco. This office he had willingly undertaken while he understood that it was to be executed in a private dwelling, but he shrunk from the idea of polluting the house of God with so heinous a crime. Two ecclesiastics were therefore selected for the commission of a deed, from which the soldier was deterred by conscientious motives. It was in the month of April 1478, the young cardinal Riario, apostolic legate, a guest in the palace of Lorenzo, proceeded to the church of the Reharata, since called "Santa Maria del Fiore," where the intended victims were present. The conspirators having taken their stations, waited with impatience for the appointed signal. The bell rang—the priest raised the consecrated wafer; the people bowed before it, and at the same instant Bandini plunged a short dagger into the breast of Giuliano. On receiving the fatal wound he took a few hasty steps and fell, when the other fiend, Francesco de Pazzi, rushed upon him with incredible fury, and stabbed him in different parts of his body, continuing to repeat his strokes even after he was apparently dead. Such was the violence of his rage that he wounded himself deeply in the thigh. The priests who had undertaken the murder of Lorenzo were not equally successful: they inflicted only a slight wound, which rather roused him to his defence, than disabled him. He instantly threw off his cloak, and holding it up as a shield in his left hand, with his right hand drew his sword, and repelled the assailants, who fled. Bandini came up with his dagger streaming with the blood of Giuliano, but was instantly laid dead by a servant of the Medici. In the mean time, the friends of Lorenzo

assembled round him, and conducted him home in safety. An attack upon the palace of government where the magistrates were sitting, by other conspirators, failed of success, and the people attached to the Medici, collecting in crowds, put to death or apprehended the assassins, whose designs were thus entirely frustrated, with the exception of the death of Giuliano. Signal and instant justice was inflicted on the criminals. The archbishop of Pifa was hanged out of the palace window in his sacerdotal robes, and Giacomo de Pazzi, with one of his nephews, shared the same fate. Lorenzo did himself honour by his efforts to restrain the fury of the populace, and induce them to commit to the magistrates the farther pursuit of the guilty. The name and arms of the Pazzi family were suppressed, its members were banished, and Lorenzo rose still higher in the esteem and affection of his fellow-citizens. The pope, inflamed almost to madness by the defeat of his schemes, excommunicated Lorenzo, and the magistrates of Florence, laid an interdict upon the whole territory, and forming a league with the king of Naples, prepared to invade the Florentine dominions. Lorenzo appealed to all the surrounding potentates for the justice of his cause; and he was affectionately supported by his fellow-citizens. Hostilities began, and were carried on with various success through two campaigns. At the close of the year 1479, Lorenzo took the bold resolution of paying a visit to the king of Naples, and, without any previous security, trusted his liberty and his life to the mercy of a declared enemy. The monarch was struck with this heroic act of confidence, and a treaty of mutual defence and friendship was agreed upon between them. Sixtus, however, persevered in the war, till a descent upon the coast of Italy by Mahomet II. excited such an alarm, that he consented to a peace upon the submission of the Florentine deputies to his pontifical reprimands.

Another attempt was made to assassinate Lorenzo in a church in the month of May 1481, but the plot was happily discovered, and the agent and his accomplices were seized and executed. From this time he generally appeared in public, surrounded with friends as a guard, a circumstance which has been represented by his enemies as a symptom of tyranny. His political conduct as head of the Florentine republic was chiefly directed to the preservation of the balance of power among the Italian states. The death of Sixtus IV. freed him from an adversary who never ceased to bear him ill-will, and he was able to secure himself a friend in his successor Innocent VIII. He conducted the republic of Florence to a degree of tranquillity and prosperity which it had scarcely ever known before, and by procuring the institution of a deliberative body of the nature of a senate, he corrected the democratical part of its constitution.

Lorenzo distinguished himself beyond any of his predecessors in the encouragement of literature and the arts: his proficiency in Italian poetry would have conferred distinction even upon one who had no other merit to adduce. The productions of this great man are distinguished by a vigour of imagination, an accuracy of judgment, and an elegance of style, which afforded the first great example of improvement, and entitle him, almost exclusively, to the honourable appellation of the "restorer of Italian literature." His compositions are sonnets, canzoni, and other lyric pieces, some longer works in stanzas, some comic satires, and jocose carnival songs, and various sacred poems, the latter as serious, as many of the former are licentious. Some of these pieces, especially those of the lighter kind, in which he imitated the rustic dialect, became extremely

tremely popular. His regard to literature, in general, was testified by the extraordinary attention which he paid to the augmentation of the Laurentian library. Although the ancestors of Lorenzo had the foundation of the immense collection of MSS. contained in this library, he may claim the honour of having raised the superstructure. If there was any pursuit in which he engaged more ardently and persevered in more diligently than the rest, it was that of enlarging his collection of books and antiquities: for this purpose he employed the services of learned men, in different parts of Italy, and especially of his intimate friend and companion Angelo Politiano, who took several journeys in order to discover and purchase the valuable remains of antiquity. "I wish," said Lorenzo to him as he was proceeding on one of these expeditions, "that the diligence of Pico and yourself would afford me such opportunities of purchasing books, that I should be obliged even to pledge my furniture to possess them." Two journeys, undertaken at the instance of Lorenzo, into the east, by Giovanni Lascari, produced a great number of rare and valuable works. On his return from his second expedition, he brought with him two hundred copies, many of which he had procured from a monastery at mount Athos; but this treasure did not arrive till after the death of Lorenzo, who, in his last moments, expressed to Politiano and Pico his regret that he could not live to complete the collection which he was forming for their accommodation. On the discovery of the invaluable art of printing, Lorenzo was solicitous to avail himself of its advantages in procuring editions of the best works of antiquity corrected by the ablest scholars, whose labours were rewarded by his munificence. When the capture of Constantinople by the Turks caused the dispersion of many learned Greeks, he took advantage of the circumstance, to promote the study of the Greek language in Italy. It was now at Florence that this tongue was inculcated under the sanction of a public institution, either by native Greeks, or learned Italians, who were their powerful competitors, whose services were procured by the diligence of Lorenzo de Medici, and repaid by his bounty. "Hence," says Mr. Roscoe, "succeeding scholars have been profuse of their acknowledgments to their great patron, who first formed that establishment, from which, to use their own classical figure, as from the Trojan horse, so many illustrious champions have sprung, and by means of which the knowledge of the Greek tongue was extended, not only through all Italy, but through France, Spain, Germany, and England; from all which countries numerous pupils attended at Florence, who diffused the learning they had there acquired throughout the rest of Europe."

The services of Lorenzo to the fine arts were not less conspicuous than those which he rendered to letters. Cosmo had collected all the most valuable remains of ancient taste and skill that he could obtain. His treasures were vastly augmented by Lorenzo, who proposed to himself the improvement of modern art as the chief end of his magnificence in this point. Of the earnestness with which Lorenzo engaged in this pursuit instances may be adduced. It is said that those who wished to oblige him were accustomed to collect from every part of the world medals and coins, estimable for their age or their workmanship, statues, busts, and whatever else bore the stamp of antiquity. By his constant attention to this pursuit, and by the expenditure of considerable sums, he collected, under his roof, all the remains of antiquity that fell in his way, whether they tended to illustrate the history of letters or the arts.

It is not, however, on this account only that he is entitled to the esteem of the professors and admirers of the arts. He determined to excite, among his countrymen, a good taste, and, by proposing to their imitation the remains of the ancient masters, to elevate their views beyond the forms of common life, to the contemplation of that ideal beauty which alone distinguishes works of art from mere mechanical productions. With this view he appropriated his gardens in Florence to the establishment of an academy for the study of the antique, which he furnished with a profusion of statues, busts, and other relics of art, the most perfect in their kind that he could procure. The attention of the higher rank of his fellow-citizens was incited to these pursuits by the example of Lorenzo; that of the lower class by his liberality. To the latter he not only allowed competent stipends, while they attended to their studies, but appointed considerable premiums as rewards of their proficiency. To this institution, more than any other circumstance, Mr. Roscoe ascribes the sudden and astonishing proficiency which, towards the close of the 15th century, was evidently made in the arts, and which commencing at Florence, extended itself to the rest of Europe. The gardens of Lorenzo de Medici are frequently celebrated as the nursery of men of genius, but if they had produced no other artist than Michael Angelo Buonarrotti, they would have sufficiently answered the purposes of the founder. It was here that this great man began to imbibe that spirit which was destined to effect a reformation in the arts, and which, perhaps, he could have derived from no other source. The art of architecture he encouraged by the numerous buildings which he erected, or induced others to erect in Florence and its vicinity, after designs furnished by the ablest artists. By these exertions he prepared the way for those wonders which have rendered the age denominated from his son Leo X. one of the most splendid in the records of mankind.

Lorenzo, in his domestic concerns, deserves considerable, but by no means unmixed praise. The licentiousness which characterizes several of his poems is said to have tainted his manners with respect to the female sex. He was nevertheless a very affectionate and attentive father, solicitous for the instruction of his children, whom he placed under the care of Politiano, and he was fond of partaking in their sports and amusements. The exigencies of the republic in consequence of its wars had obliged him to borrow, in his own name, large sums, which the negligence or infidelity of his commercial agents and correspondents rendered it difficult for him to repay; and a decree for the discharge of his debts out of the public treasury was necessary to relieve him from his embarrassments. From this period he determined to quit his mercantile concerns, for the improvement of his estates under his own eye. He had a numerous family, in the settling of which he was as successful as an ambitious parent would generally desire. His eldest son Piero, designed for his own successor in the Florentine state, was sent, at the age of fourteen, to visit the pope, and cultivate the family interest of Rome. The object of his close connection with the pontiff, and the profound respect which he always testified for the holy see, was the attainment of the favourite point of his ambition, the elevation of his second son Giovanni to the cardinalate, with the future prospect of his filling the papal chair. By means of incessant applications, he prevailed upon the pope to confer upon Giovanni, at the age of thirteen, the high dignity of one of the princes of the Roman church, which was unquestionably a flagrant violation of decorum, dishonourable to both.

“It was,” says one of the biographers of Lorenzo, “a deserved consequence of this prostitution of ecclesiastical honours, that this cardinal, when arrived at the popeedom, should, by his levity and extravagance, have given the immediate occasion to that defection from the church of Rome, which has so much reduced her power and authority.” (For a farther account of this pontiff, the reader is referred to LEO X.) Of his other children, Giuliano became allied to the royal house of France, and obtained the title of the duke of Nemours; and his daughters married into noble families.

In the year 1488, Lorenzo's domestic comfort was much impaired by the loss of his wife. He was at this time absent at the warm baths, which he was often obliged to use, on account of a gouty complaint that severely afflicted him, and had made an early breach in his constitution. In the intervals of ease and health, he appears to have flattered himself with the expectation of enjoying the reward of his public labours, and partaking of the general happiness, which he had so essentially contributed to promote, in a peaceful and dignified retirement, enlivened by social amusements, by philosophic studies, and literary pursuits. These expectations were built upon the most substantial foundation, the consciousness that he had discharged his more immediate duties and engagements. “Having,” says he, “now obtained the object of my cares, I trust I may be allowed to enjoy the sweets of leisure, to share the reputation of my fellow-citizens, and to exult in the glory of my native place.” This prospect of relaxation and happiness he was not destined to realize. Early in the year 1492, the complaint under which he laboured attacked him with additional violence, and while the attention of his physicians was employed in administering relief, he contracted a slow fever, which escaped their notice, until it was too late effectually to oppose its progress. He sunk, almost before his attendants suspected danger, into such a state of debility, as totally precluded all hopes of recovery. Having performed the offices of the church, and adjusted with sincerity and decorum his spiritual concerns, he requested a private interview with his son Piero, with whom he held a long and interesting conversation on the state of the republic, the situation of his family, and the conduct which it would be expedient for him to pursue. When Lorenzo had relieved his mind from the weight of its important concerns, he became more sensibly alive to the emotions of friendship. At this moment Politiano entered his chamber: Lorenzo heard his voice, and raising his languid arms, clasped the hands of his friend in his own, and at the same time steadfastly regarded him with a placid and even a cheerful countenance. Deeply affected at this silent, but unequivocal proof of his esteem, Politiano could not suppress his feelings, but, turning his head aside, attempted, as much as possible, to conceal his sobs and his tears. Perceiving his agitation, Lorenzo still continued to grasp his hand, as if intending to speak to him when his passion had subsided; but finding him unable to resist its impulse, he relaxed his hold, and Politiano, hastening into an inner apartment, flung himself on a bed, and gave way to his grief. Having at length composed himself, he returned to the chamber, when Lorenzo enquired with great kindness why Pico of Mirandola had not once paid him a visit during his sickness. Politiano apologized for his friend, by assuring Lorenzo that he had only been deterred by the apprehension that his presence might be troublesome. “On the contrary,” replied Lorenzo, “if his journey from the city be not troublesome to him, I shall rejoice to see him before I take my final leave of you.” Pico came, prepared with

a melancholy pleasure, to share, for the last time, the interest of his conversation. Lorenzo expressed his esteem for him in the most affectionate terms, professing that he should meet death with more cheerfulness after this last interview. He then changed the subject to more familiar and lively topics; and it was on this occasion that he expressed, with some degree of jocularly, his wishes that he could have obtained a reprieve, until he could have completed the library destined to the use of his auditors. This interview was scarcely terminated, when the haughty priest Savonarolo reminded him, that it was his duty to bear death with fortitude, “with cheerfulness,” replied Lorenzo, “if such be the will of God.” His vivacity as well as his resignation were perceptible almost to the last moment. Being asked, on taking a morsel of food, how he relished it, “as a dying man always does,” was his reply. Having affectionately embraced his surrounding friends, and submitted to the last ceremonies of the church, he became absorbed in meditation, occasionally repeating portions of scripture, and accompanying his ejaculations with elevated eyes and solemn gestures of his hands, till the energies of life gradually declining, and pressing to his lips a magnificent crucifix, he calmly expired, in the forty-fourth year of his age. Few persons of his condition have filled so contracted a space of life with so much glory and prosperity.

In summing up his character, Mr. Roscoe says, he is “a man who may be selected from all the characters of ancient and modern history, as exhibiting the most remarkable instance of depth of penetration, versatility of talent, and comprehension of mind.—Of the various occupations in which Lorenzo engaged, there is not one in which he was not eminently successful: but he was more particularly distinguished in those which justly hold the first rank in human estimation. The facility with which he turned from subjects of the highest importance, to those of amusement and levity, suggested to his countrymen the idea that he had two distinct souls combined in one body. Even his moral character seems to have partaken, in some degree, of the same diversity; and his devotional poems are as ardent as his lighter pieces are licentious. On all sides he touched the extremes of human character, and the powers of his mind were only bounded by that impenetrable circle, which prescribes the limits of human nature.”

After all that we have said of this great man, and his grandfather Cosmo, those who would rightly appreciate their talents and various virtues, will consult the life of Lorenzo De Medici by Mr. Roscoe, of which the first chapter is chiefly devoted to Cosmo, the remainder of the three volumes to Lorenzo and the fortunes of his house.

MEDICINA MUSICA, or the medicinal Power of Music; being an essay on the effects of singing, music, and dancing on the human frame, revised and corrected. To which is annexed, a new essay on the nature and cure of the spleen and vapours, by Richard Browne, apothecary at Oakham, in the county of Rutland, small 12mo. London, 1729.

This is the title of a small tract but little known; but as it is not devoid of merit, we shall give some account of the author's principles. We feared we should have had the old stories over again, of Orpheus, Linus, Amphion, and Terpander; but their names do not once occur in the work. The author does not ascribe any miraculous powers to music, as the Greeks, the Chinese, and the Arabians have done; who pretend to cure many diseases with the instrument called *Oüd*, resembling our lute: he only points out its mechanical effects on the nerves and animal spirits. He is moderate in his demands, and modest in his assertions. It is not elaborate composition,

composition, or exquisite performance, that is required to operate the effects which he describes; but the *dulce lumen* of Horace.

The gentle exercise of the lungs in singing, as well as the gratification of the ear in hearing sweet tones well accented, are among the prescriptions. And for this he only requires the patient to have an ear well organized, and the vocal performance to consist of gay and lively strains, so that the body and the mind may be reciprocally affected by the production and sensation of sound. As the motion of the blood is accelerated or retarded during the rise or fall of the mercury in the barometer; so in singing, the pressure of the air upon the lungs is greater than in common respiration.

The author supports his opinions ably and anatomically. He seems to have loved and understood music, though he never speaks of it with the enthusiasm of a rapturist.

Among the possible evils of too frequent and too violent exercise of the lungs, we with the author had cautioned parents not to let their children, whatever disposition they may discover for singing, begin to exercise the voice seriously in difficult songs, or *solfeggios*, till arrived at their teens: as we have frequently known a promising voice sung away, by tearing and straining the vocal organ beyond its power. Let them hum a tune, or sing a light and pleasing ballad if they please; but leave different intervals, and long and high notes, to a more robust and mature age.

In asthmatic complaints, when the tone of the stomach is relaxed, and appetite fails; and in nervous disorders, as music raises the spirits, and diverts our attention from ourselves and our woes, real or imaginary, singing is not only amusing but salutary.

The author, however, seems to think that nervous and low-spirited persons should refrain from pathetic, melancholy, and languid airs, which, instead of exhilarating and enlivening the spirits, rather tend to their depression. But on the contrary, in affliction, pain, and sorrow, as well as in hypochondriac and calamitous cases, when gay and lively music is to the last degree offensive, we rather enlist with those who think grave music, if it cannot radically cure, can sooth, alleviate, and afford a temporary relief.

And among the medicinal effects of modern music that border on the marvellous, we read in the memoirs of the Acad. des Sciences at Paris, that a musician was cured of a violent fever, by a concert of well selected and well executed music in his bed-chamber. And the effect which Farinelli's singing had on Philip V. king of Spain, who like Saul seemed to have been troubled with an evil spirit, has never been disputed.

As to the author's *Medicina Gymnastica*, as a specific for spleen, vapours, and hypochondriac affections, we shall leave the consideration of these mysterious disorders to the profound sons of Æsculapius, who peradventure may be perfectly acquainted with their nature and existence. Mr. Browne, who has not defined them very clearly, prescribes, however, after other preparatory medicines, dancing to a good band of music for the completion of the cure. And as the music is meant to exhilarate and excite motion, the whole process seems reduced to the two most simple of all Hygeia's agents, *Air* and *Exercise*.

To these Armitrongs adds *Sun-shine*.

“Cheer'd by thy kind invigorating warmth,
We court thy beams, great majesty of day!
If not the soul, the regent of this world,
First-born of heaven, and only less than God!”

MEDICINAL WATERS. See WATERS.

MEDICINAL Sacculus. See SACCULUS.

MEDICINE, MEDICINA. from *in dei*, to heal or cure, is the art of restoring health to the sick.

It must be obvious, from a slight consideration of the subject, that various and comprehended knowledge must concur to give perfection to this art. It is not from the labours of an individual, though he were an Æsculapius, nor even from the united collections of an age, that the nature and means of curing the disorders of the animal frame can be fully ascertained. For, to trace the matter in detail, it is necessary to be previously acquainted with the structure of the animal machine, or with the *anatomy* of the body; and likewise with the uses and actions of its various organs, in a state of health, the knowledge of which constitutes the science of *physiology*. But to the proper cultivation of this science, a previous knowledge of many other departments of science is absolutely necessary. Almost every branch of natural philosophy, indeed, contributes to the explanation of the functions of the animal economy. The uses of the eye are intelligible only upon the principles of *optics*, as applied to inorganic instruments; the functions of the ear upon those of *acoustics*; and the various mechanical operations of the body, such as those of muscular motion, the circulation of the fluids, the action of respiration, &c. upon the common principles of *mechanics* and *hydrostatics*: not to mention the numerous changes in the combinations and properties of the fluids; in the blood, as it passes through the lungs; in the food and drink, under the process of digestion; and in the various secreted fluids, as the urine, milk, bile, &c.; for the elucidation of which, the science of *chemistry* lends its aid. Upon these branches of knowledge the foundation of medicine is laid; but the superstructure requires many additional materials for its erection. The animal machine differs materially from all other examples of mechanism; principally in the possession of a self-sustaining and self-moving power, upon which alone the operation of every external influence must be directed; and from which result many phenomena, that belong exclusively to its constitution, and are inexplicable on any of the principles of mechanical or chemical philosophy: but it differs likewise, secondarily, in the circumstance that its motions are not (as in other machines) exposed to our view; that we cannot remove, repair, and renew, (as in them,) those parts or organs which become inadequate to their functions, and cannot suspend the motion of the whole but for a moment, without the imminent risk of stopping it for ever. Hence then, in addition to the principles of mere mechanism, the study of the animal constitution includes a series of minute observations on those phenomena, which are the result of *life*; and this study is necessarily rendered more obscure and difficult, from the circumstance last alluded to: for the internal operations of the vital machine, not being directly cognizable, can only be ascertained by indirect inference from external and obvious signs or symptoms. These signs or symptoms, therefore, are the sole object of the examination of the practitioners of the art of medicine, and the sole guides of their proceedings. But as the existence and the nature of disease are known only by a comparison of those signs, which are exhibited by the body in health, with those which occur in disease; so the study of symptoms includes not only the science of *pathology*, but also a knowledge of the various *temperaments*, as they have been called, or of those various appearances of the structure, complexion, size, strength, &c. which are all compatible with health. (See TEMPERAMENT.) The signs of the respective diseases of the different organs of the body we have detailed under their proper appellations, in

the various articles in *medicine* and *surgery*; and a series of the signs which are to be investigated, as the indications of disease in general, will be found under the article DISEASE.

Possessed, however, of this knowledge, we should still be little more than useless, though learned, spectators of the phenomena of disease, if we were ignorant of all means of controlling the actions of the vital power. The art of medicine, then, obviously requires also a knowledge of the various productions of the material world, and of their properties, *i. e.* their agency upon the animal system: for these productions afford the instruments by which alone art can effect any physical change in its condition. A series of ages would be requisite to teach mankind the physical properties of the animal, vegetable, and mineral substances, by which they are surrounded; and the nature of many of them could only be ascertained by accidental trials, from the fatality, injury, or benefit derived from which, a slow but multiplying experience would ultimately arise. "Hæc similiaque cum quotidie inciderent, diligentes homines notasse, quæ plerumque melius responderent; deinde ægrotantibus ea præcipere cæpisse: sic medicinam ortam, subinde aliorum salute, aliorum interitu, perniciofa discernentem a salutaribus." (Celsus. Præf.) The knowledge of the *materia medica* has thus been gradually brought to that comprehensive extent, in which it exists at present, by a long series of experiments, aided by the researches of travellers and naturalists, and by the discoveries and combinations of chemists.

The progress of the art of medicine, however, as Celsus has intimated, was the reverse of the foregoing statement. "Repertis deinde medicinæ remediis, homines de rationibus eorum differere cæpisse; nec post rationem, medicinam esse inventam; sed post inventam medicinam, rationem esse quaesitam." (Loc. cit.) The history of the progress of medicine is, in fact, principally a history of those reasonings, or hypothetical systems, adopted by different individuals and their followers; and these consisted chiefly in transferring to the science of life the doctrines of the collateral departments of philosophy, which were successively cultivated, as the following sketch will evince.

MEDICINE, History of. The history of medicine has for its object to describe the origin and progress of the art, and to investigate the causes and consequences of the different revolutions which it has undergone.

Some authors have wasted much time and learning in attempting to depict the first origin of physic. Thus Schulze, a writer of great erudition, who was professor at Altorf in the beginning of the 18th century, has traced it to the fall of man; shewing, with great gravity, what observations Adam and Eve were likely to make on the subject of their natural appetites, and the evacuations which followed their indulgence; what a rich store of physiological knowledge they would collect, "quum se mutuo contemplantur, quum amplecterentur, coirent;" and how probable it is, that Adam, yielding to the necessity of the occasion, "laboranti amicæ, obstetricias manus adhibuisse, sicque chirurgiæ primam forte operationem exercuisse!" Even Le Clerc thinks it necessary to discuss the question, "Si la médecine est venue immédiatement de Dieu?" and to shew, that the first man must have been also the first physician. And Brambilla, a surgeon of some repute at Vienna, asserts that Tubal Cain was the inventor and manufacturer of several surgical instruments; whence he endeavours to prove the greater antiquity of surgery!

It is evident, however, that medicine must have had a very early origin: for mankind, even in the most uncivilized

ages of the world, would soon be led to remark the more or less agreeable, and more or less salubrious, qualities of the different articles of their food; and exposed, as they would be, in the common course of things, to a variety of accidents, they would, by degrees, learn the means of alleviating the pain, or averting the consequences of the more usual external injuries. They would thus, in process of time, form to themselves certain dietetic maxims and rules, for the treatment of those diseases to which they found themselves liable. Their *materia medica* would probably, at first, consist of only a few herbs, which they had discovered to be efficacious in suppressing hemorrhage, and in healing wounds, or to which they imputed virtues, real or imaginary, in the cure of internal complaints; but all the concomitant circumstances, under which they had observed recovery, in any doubtful case, to take place, would be regarded as indispensable in every similar case, and would be imitated accordingly. "Tunc non sanabat medicina," as Meibomius shrewdly remarks, "sed quidquid videbatur sanasse erat medicina." Unacquainted, however, with the economy of the human body, and unable, for the most part, to trace the progress of disease, they would ascribe the more fatal internal disorders to the powers of sorcery, or to the wrath of those deities whom they had been taught to fear; and would resort, for their cure, to those rites and ceremonies by which they conceived they could break the charm, and pacify the offended gods. Hence would arise various superstitious practices, which would be handed down from one generation to another, and of which the priests and magicians of the communities would gladly avail themselves, as affording them the means of extending their influence. Such we may conceive to have been the origin of the medical art; and such nearly is its condition at the present day, among the savages of Africa and America, New Holland, Zealand, &c. See Winterbottom's Account of the native Africans in the Neighbourhood of Sierra Leone, vol. ii. Millar's Disquisitions in the History of Medicine.

The Egyptians appear to have been the first nation which cultivated medicine in a systematic manner. Thouth, or Taout, (the *Hermes Trismegistus* of the Greeks,) who had been, according to Diodorus, the secretary of Osiris, had divine honours paid him, as the inventor of letters, and of all useful arts and sciences. His doctrines were collected, after his death, into a book, to which the title of "Embré" (*Scientia Causality*) was given. A great part of this work consisted of medical precepts, which the physicians or priests were bound to observe strictly. If they followed the directions, and the patient happened to die, they were held free from blame; but if they deviated in any manner from the rules laid down, they were punishable with death, whatever might be the issue of the case. Another of the Egyptian deities, Apis, is mentioned by some as the inventor of medicine; but greater influence is attributed to Serapis, whose most ancient temple was at Memphis, and who was worshipped by the Greeks, as well as Egyptians, as presiding over health. In whatever way these divinities may be supposed to have first attracted the adoration of the people, it is certain that the priests, from among whom the ancient kings of Egypt were chosen, appropriated to themselves the functions of the medical art. The chief priests exercised what was considered as the higher branch of the profession, which consisted of magic rites and prophesying. They are the wise men and magicians of whom Moses speaks, and they appear to have been very expert in their tricks. On the *Pastophori*, or image-bearers, who were an inferior order of the priesthood, devolved the task of studying the six hermetical

metical books on medicine. These treated of the structure of the body, of diseases in general, of surgical instruments, of materia medica, of diseases of the eyes, and of diseases of women. It was the office of the chief priests to prognosticate the course and event of the disease, while the pallaphori applied the remedies as directed in the sacred books. As the rank of the Egyptian priests was hereditary, as the son received and obeyed implicitly the instructions of the father, and as their knowledge was communicated to none but those who had been adopted into their order, it is evident that their medical knowledge would remain nearly stationary. It was obviously their interest to teach the people, that all diseases proceeded from the immediate agency of the god, and were to be cured only by sacrifices and offerings. They concealed their art under the forms of religious ceremony, and consequently we know very little concerning the details of their practice. Judging, however, from the analogy of other nations, we may infer that they left the cure of diseases, in a great measure, to nature; and were content with promoting the discharges, which seemed to be indicated. This opinion is in some degree confirmed by the remarkable circumstance which Aristotle mentions, (Polit. lib. iii.) viz. that it was contrary to their rules to venture upon any active treatment before the fourth day of the disease. We have the testimonies of Diodorus and Plutarch, that incubations were practised in the temples of Isis and Serapis; and we learn from Pliny (lib. viii. c. 46.), that predictions of life and death were delivered in those of Apis.

In the time of Herodotus, the state of physic in Egypt seems to have been somewhat altered. According to this historian, "every distinct distemper had its own physician, who confined himself to the study and cure of that, and meddled with no other; so that all places were crowded with physicians; for one class had the care of the eyes, another of the head, another of the teeth, another of the stomach, and another of occult diseases." But Herodotus would scarcely have spoken thus of the priest-physicians. We must therefore suppose that his description applies to the exoteric practice of medicine, as professed by Jatrapiæ and others; and we are inclined, notwithstanding the dogmatical commentary of Warburton, to put a somewhat similar interpretation on the passage of Genesis (c. 1 v. 2.), in which it is said, that "Joseph commanded his servants, the PHYSICIANS, to embalm his father; and the PHYSICIANS embalmed Israel." On the strength of this use of the word *physicians*, the author of the divine legation (b. iv. § 3) has amused himself with forming an ideal picture of "the grandeur, luxury, and politeness" of the Egyptian people; and the writer of the article MEDICINE in the Encyclopedia Britannica has hastily concluded that the first physicians of Egypt were not of the order of priests; but, when we consider what must have been the state of medicine in Joseph's time; and when we find, that, long afterwards, the priests of the Jews were, properly speaking, their only physicians, it will at once appear, how absurd and untenable the above cited translation of the original text is. It is far more probable, and it is certainly more consonant with all that we have learnt concerning Egyptian history, to believe that the **יִרְמְיָהוּ**, whom Joseph ordered "to embalm his father," were merely *embalmers*, or, as we might term them, *undertakers*. So, in fact, they are designated in the septuagint; *και προσηλαξιν Ιωσηφ τοις παισιν αυτου, τοις εμβασιασι, εμβασιασαι τον πατερα αυτου. Και εμβασιασαν δι εμβασιασαι τον Ισραηλ.* We know pretty accurately in what manner the ceremony of embalming was performed, and in what degree of estimation the persons who executed the office were held; we know, too, that among the ancient Egyptians, there was a great division of labour,

and that no one was allowed to meddle with the trade or profession of another; it is, therefore, not very likely that, if Joseph had been so affluent as to retain a number of physicians in his suite, as Warburton supposes, they would have condescended, or been permitted, to embalm the body of his father. From the distribution of medical practice, as described by Herodotus, however, one might be disposed to infer, that the Egyptians had already made considerable advances in the art; but as they were, in a great measure, debarred from all opportunities of acquiring anatomical knowledge, by the horror that pursued every one who cut open a dead body; and as they laboured, besides, under many other restrictions in the cultivation of the science, this could not possibly have been the case. That the Egyptian physicians were even very unskilful in the treatment of external complaints, is proved by what the author just mentioned relates (lib. iii. c. 129.) concerning their inability to cure a common luxation of the foot, which Darius, the son of Hytaspes, had met with in hunting. They appear, however, to have been acquainted with the powers of some valuable remedies, as of squills in dropsy, and of iron as a tonic in cachectic diseases.

Medicine was established on nearly the same footing among the Jews, as among the Egyptians. The priests, forming the only learned class, constituted themselves the sole judges and physicians of the people. Diseases were beheld to proceed from the wrath of "a jealous God;" and prayer was the chief means employed for their removal (Gen. xx. 17. Numb. xii. 13.); an immediate revelation to Moses even declares, that if the people would give ear to the commandments of the Lord, and keep all his statutes, he would put none of those diseases upon them which he had brought upon the Egyptians, for it was the Lord that healed them. (Exod. xv. 26.) It would appear, however, from different passages of the Pentateuch, and, in particular, from the enumeration of the different signs and varieties of leprosy, in Leviticus xiii., that the lawgiver of the Jews must have been, at least, a very accurate observer. Some persons have concluded, that he must have been also deeply skilled in chemistry, from his being able to dissolve the golden calf, in the wilderness, and from his changing the bitter waters of Marah to sweet, by means of a certain wood; but without more particular information respecting the means which he employed on these occasions, it is impossible to form any accurate estimate of his chemical proficiency. In later times, the *prophets* of the Jews signalized themselves by healing the sick, raising from the dead, and occasionally denouncing the infliction of distempers on those who had rebelled against the law of God.

Recent researches have shewn, that, at a very early period of history, the inhabitants of Hindoostan had made great progress in several branches of physical science, but there does not appear to be any reason for believing that in the art of curing diseases, they were superior to the surrounding nations. According to Strabo (lib. xv.), they trusted chiefly to diet, and to external applications; the superintendance of the sick was committed in the towns to a particular description of magistrates, under whose inspection the Samaneans (*Σαμαναις*) were permitted to practise. A law prevailed, that whoever discovered a poison, was bound to keep it secret till he had found an antidote to it; if he succeeded in discovering the latter, he was rewarded with great honours; but if he made known the poison without the antidote, he was punished with death.

Under the despotic government of China, whatever its admirers may choose to say, and whatever degree of antiquity they may ascribe to its institutions, it was utterly impossible

possible that the liberal arts could attain any high improvement. The medical code, which is ascribed to Hoangti, and said to have been composed 4000 years ago, but which has been proved to be of much later origin, forms the guide of the Chinese physicians. Formerly there were public schools in different parts of the empire, in which medicine was taught in conjunction with astrology; but these no longer exist; and the art itself, as we learn from sir George Staunton and other late travellers, is in a very degraded state. The *Specimen Medicinæ Sinicæ*, for which we are indebted to Cleyen, sufficiently proves that the Chinese were never acquainted with its fundamental principles.

There is a striking coincidence between the accounts which have been given of the medical divinities among the Greeks, and those of the Egyptians, though it may be doubted whether the Greeks derived their knowledge of the art from the latter people. Like the Isis and Osiris, Apollo and Minerva became the gods of physic in Greece, and Orpheus, who was said to be the son of Apollo and Calliope, performed the part of Thouth; instructing his countrymen in the mysteries of religion, in poetry, and in medicine. According to some chronologists, however, Melampus is reported to have flourished considerably before his time, and to have distinguished himself by his medical skill; of which he gave a remarkable proof in the cure of the daughters of Prætus, king of Argos, who were attacked with leprosy and madness. Afterwards it would appear that all the chief heroes of Greece, and particularly those of the Argonautic and Trojan expeditions, were more or less versed in the physical art; in which they are said to have received their instruction from Chiron the Thessalian, surnamed the Centaur. Cephalus, Æsculapius, Melanion, Nestor, Amphiaraus, Peleus, Telamon, Meleagrus, Theseus, Hippolytus, Palamedes, Ulysses, Menestheus, Diomedes, Castor, Polydeuces, Machaon, Podalirius, Antilochus, Æneas, and Achilles, are all mentioned by Xenophon as the pupils of Chiron. Of these by far the most celebrated is Æsculapius, or Asclepius, the reputed son of Apollo and Coronis. He was probably a Thessalian prince; and he is described as particularly successful in the cure of external diseases. That, indeed, his merits must have been very extraordinary for the age in which he lived, seems proved by the fable, that Jupiter was obliged to remove him from the world, to prevent the growing indifference of mankind towards the gods, and the desolation of Pluto's kingdom. Some time after his death, divine honours began to be paid him; in consequence, chiefly, of his descendants devoting themselves to the medical profession; pretending to have derived their knowledge immediately from him, and ascribing all the cures which they effected to his direct influence. His sons, Podalirius and Machaon, have acquired a durable celebrity from the mention which the author of the Iliad has made of their surgical skill.

From the Trojan war till the age of Hippocrates, the art of medicine continued chiefly in the hands of the priests, who exercised it for their own profit in the temples of the gods. In conformity with the superstitious character of the age, the patients were taught to expect a cure, or at least to learn the means of obtaining it, in dreams, for which they were previously prepared, or rather stupefied, by a course of imposing ceremonies. The temples were generally situated in the neighbourhood of rivers, or mineral springs, and in elevated situations, where the influence of the fresh air, and the beauty of the surrounding prospects, were likely to excite cheerful ideas, and to conduce to the recovery of the patient. Bathing was an indispensable part of the initiatory process; and this, conjoined with the strict abstinence which

was enforced, doubtless often effected a cure. When recovery took place, the patients were led, from gratitude, to present various offerings to the deity of the place; sometimes pieces of money were thrown into the spring where they had bathed, or from which they had drunk; at other times drawings and images of the diseased parts, or tablets descriptive of the disorder and cure, together with the names of the patients, were suspended in the temples. These narratives, some of which have been rescued from oblivion by the industry of Grüter (Corp. Inscript.), must have doubtless contributed to the progress of the art, and supplied the successive generations of priests with some useful practical observations. The temples in which they were recorded, particularly those of the Asclepiades, became, in fact, so many medical schools, differing however from one another, and that often materially, in their doctrines and practice. Thus, the Cnidian school distinguished itself by its strict empiricism; while that of Cos had more of a dogmatical character, laying much stress on the knowledge of the exciting causes, and the prognosis of disease, and pursuing a more methodic and rational mode of treatment. The former produced Euryphon, the author of the *Εὐρυφῶν Κηρύξεις*, and Ctesias, of whose Persian history some fragments have been preserved by Photius; in the latter was developed the genius of Hippocrates.

At first, they were only the actual descendants of Æsculapius who were instructed in the art: afterwards other persons were admitted as pupils, having previously undergone a particular initiation, and bound themselves by an oath to conform to the rules of the Asclepiades. Some philosophers of comprehensive genius, however, accustomed to speculate on the origin of things, the nature of man, &c. had already begun to extend their researches to medicine, and succeeded in rescuing the study, to a certain degree, from the dominion of the priests. Of these benefactors of their race, no one is more deserving of mention than Pythagoras, who, after visiting Egypt and India in quest of knowledge, returned to his own country and established the school of Crotona. He applied himself to the study of the animal economy; introduced a regular system of dietetics; and did not neglect the practice of medicine. His attempts to explain every thing by the power of numbers, were, indeed, sufficiently ridiculous; and his therapeutical maxims differed scarcely from those of the temples; but the rules of regimen which he inculcated were, generally speaking, very judicious, and implied considerable powers of observation; though they have, no doubt, been carried to an extravagant length by his followers. Among his immediate disciples, Alcmaeon is celebrated as the inventor of anatomy; and though his knowledge of the internal structure of the human frame may be disputed, yet the concurring testimonies of Aristotle, Diogenes, and Plutarch, abundantly prove that he made no inconsiderable figure as a comparative anatomist. He is also the author of the first theory of sleep. "When the blood," he says, "returns into the larger blood-vessels, sleep is induced: when it is again distributed, waking occurs; but a complete congestion is followed by death." (Plutarch de Plac. Philos. lib. v. c. 23.) Empedocles was another distinguished adherent of the Pythagorean sect. See EMPEDOCLES.

Besides these philosophers, and the Asclepiadæ, there were, at this period, other persons who devoted themselves to the profession of physic, and who occasionally were remunerated by a fixed salary. Thus, Democetes of Crotona was retained at the court of the Samian tyrant, Polycrates, with an allowance of two talents yearly: being afterwards taken prisoner, and carried as a slave into Persia, he acquired great repute by curing Darius of a sprained foot, after the Egyptian

Egyptian physician had failed, and also by his successful treatment of a tumour of the breast, under which Atolla, the daughter of Cyrus, and wife of Darius, had laboured for a considerable time. (Herod. iii. 133.) Such practitioners, from their wandering lives, were sometimes designated by the name of *περιδωτοι*. Of this class, one of the most conspicuous was Acron of Agrigentum, the contemporary and rival of Empedocles, respecting whom Pliny has fallen into a strange error, in describing him as the founder of the empiric sect "under the sanction of Empedocles." According to Diogenes, he was the author of some books on medicine and dietetics, written in the Doric dialect; and he signified himself at Athens, in the time of the great plague, by introducing the practice of fumigations (*πυρ κλινοειξ παρκακων τοις ιοσμοσι*), and thus affording relief to many. (Plut. de Isid. et Osir.) The *gymnasia* of ancient Greece seem also to have contributed to the improvement of the art. It belonged to the *gymnasiarch*, or *palaestrophylax*, to regulate the diet of the youths who were trained in these seminaries; the *γυμνασαι* were presumed to be conversant with diseases; and it was the business of the *αλιπτειαι* to perform venesection, to dress wounds, fractures, &c. They were sometimes called physicians. It was in these seminaries that the gymnastic system of medicine originated, under the auspices of Iecus of Tarentum, and Herodicus of Selymbria. See HERODICUS.

The first year of the eightieth Olympiad gave birth to Hippocrates, the second of that name, who was destined to effect a greater revolution in medical science than had hitherto been accomplished, and whose authority continued to be regarded with almost implicit veneration by his successors, during a period of more than two thousand years. "He saw," says Mr. Cabanis, "that too much, and yet not enough, had been done for medicine; and he accordingly separated it from philosophy, to which it had never been united by its true and reciprocal relation. He brought the science back again into its proper channel, that of rational experience. However, as he himself observes, he introduced both these sciences into each other, for he considered them as inseparable; but he assigned to them relations which were altogether new. In short, he freed medicine from false theories, and formed for it new and solid systems: this, he with justice said, was to render medicine philosophical. On the other hand, he elucidated moral and natural philosophy by the light of medical science. This we may, with propriety, call with him the introduction of the one into the other.

"The new spirit of improvement, which was thus communicated to medicine, resembled a sudden light that dispels the phantoms of darkness, and restores to bodies their proper figure and natural colour. By rejecting the errors of former ages, Hippocrates learned more fully to avail himself of the useful part of their labours. The connection and dependence, both of the facts which had been observed, and of the conclusions which had been legitimately deduced from their comparison, were now perceived with a degree of evidence, which, till then, had been unknown. All the discoveries were certainly not yet made; but from that moment inquirers began to pursue the only path which can conduct to them; from that moment, if they had been able to preserve themselves from delusion, they would have possessed sure means of estimating, with precision, the new ideas which time was destined to develop; and if the disciples of Hippocrates had understood his lessons well, they might have laid the foundation of that analytical philosophy, by the aid of which the human mind will be henceforth enabled to create to itself, as it were, daily, some new and improved

methods of advancement." *Coup d'Œil sur les Révolutions, &c. de la Médecine*, 76—78.

Unfortunately, however, for the progress of the art, the disciples of Hippocrates either did not "understand his lessons," or, misled by vanity, or other more ignoble passions, they soon deviated from the path which he had struck out. Instead of pursuing quietly the observation of nature, they consumed their time in framing fanciful hypotheses to explain her operations: instead of studying, in a sincere spirit, the works of the master whom they professed to worship, they shamelessly falsified his writings, in order to adapt them to their own peculiar views, so that it has become, as we have already had occasion to shew, (see HIPPOCRATES,) a matter of no small difficulty to distinguish the genuine from the spurious compositions that have been ascribed to the father of medicine. But, notwithstanding these errors, it cannot be doubted, that the genius of Hippocrates exerted a highly beneficial influence on the minds of succeeding inquirers; and that, without his writings for a guide, the science of physic would have remained, for a much longer period, in a state of infancy. "Au lieu de ces systèmes, sinon meurtriers, du moins ridicules, qu'a enfantés la médecine moderne pour les proferir ensuite, on y trouve des faits bien vus et bien rapprochés; on y voit un système d'observations, qui encore aujourd'hui sert de base à l'art de guérir." D'Alembert, *Mélanges*, iii. 271.

The Dogmatic school, of which Hippocrates has erroneously been considered as the head, was founded by his sons Theſalus and Draco, and his son-in-law Polybus, who are the reputed authors of many of the books that now pass under Hippocrates' name. Polybus is mentioned by Aristotle as the compiler, at least in part, of the book "On the Nature of Man," which contains all the leading tenets of the Dogmatists, and which was regarded by Galen not as the composition of one individual, but as a collection of fragments by different writers. Applying the mystical doctrines of the Platonic philosophy to medicine, the Dogmatists proceeded upon the principle which has exerted such baneful influence on the progress of science in general, *viz.* "that where observation failed, reason might suffice." (*De Arte*. Ed. Foef. 1657. p. 6.) They accordingly were led to neglect the patient study of nature; and before they had collected a sufficient store of facts, they fondly imagined that they had laid the foundation of an incontrovertible system. Hence it came, that in their inquiries, sophistry often usurped the place of observation, and futile hypothesis was preferred to experience. In this way arose a multitude of sects, who contributed little or nothing to the advancement of the art, but, on the contrary, were daily misleading their followers more and more from the right path of research. It is therefore highly unjust to refer the origin of the Dogmatic school to Hippocrates, in whose genuine writings it will be found that the most opposite principles are inculcated. For a more particular account of the doctrines of this sect, see EMPIRIC.

About the same period, Eudoxus of Cnidos introduced the Pythagorean system, and a modification of the Egyptian practice, in which he was followed by his disciple Chryſippus. With the latter, cabbage and other vegetables were the favourite remedies; to purgatives and blood-letting he had an aversion. One of the most distinguished men of the age, however, was Diocles of Caryſtus, whom Pliny (xxvi. 2.) ranks as almost equal to Hippocrates. He employed himself in comparative anatomy, and corrected many errors of his predecessors: like the two last mentioned physicians, he united the doctrines of Pythagoras with medicine; ascribing

ing great influence to the number seven and its combinations. (Macrob. in Somn. Scip. i. 6.) He was also the inventor of a surgical instrument for the extraction of arrows, called after him *Diocleus graphiceus*. His contemporary, Praxagoras of Cos, is not less deserving of notice on account of his anatomical labours, being the first person who established the distinction of arteries and veins, and who demonstrated the absence of *cotyledons* in the human uterus; whence Sprengel (Geschichte der Arzneikunde, i. 549.) has with great plausibility conjectured, that dissections of the human subject could not have been, at that time, entirely unknown. Praxagoras also introduced the doctrine of the pulse, and reduced the humoral pathology to a more regular system: he made frequent use of venesection, particularly in hemorrhage, and was a bold surgical operator; for he scrupled not, as Cælius Aurelianus informs us, to lay open the abdomen, and divide the *intestinum rectum*, in the iliac passion, in order to remove the accumulated fæces.

Many circumstances had now concurred to favour the advancement of natural knowledge. The spirit of inquiry, which the early philosophers had excited, was cherished by the establishment of so many rival schools; but, above all, by the number of learned men, who arose to adorn and instruct the world. Within the short space of a century appeared Aristotle, Pyrrho, Theophrastus, Zeno, and Epicurus, all of them endowed with transcendent genius, and conspicuous for their zeal in the cause of science. The influence which they exerted on the character of their age was accordingly very great. While Aristotle applied himself, with the most signal success, to all the branches of moral and physical research, and his pupil Theophrastus laid the foundation of true botanical science; Zeno and Epicurus developed those beautiful systems of ethics, which transported their contemporaries, and which still, in some measure, divide the minds of men. However remote from medicine the speculations of moralists may at first sight appear, a little observation will teach us, that the physicians of almost every age have allowed themselves to be carried along by the current of prevailing opinions. In the epoch of which we are now writing, the tenets of Pyrrho and Epicurus were eagerly seized upon by the empirical sect, as favouring their peculiar views; while the stoical system gave new strength to the dogmatists, particularly by the introduction of the dialectic method.

The establishment of a magnificent library and museum of natural history at Alexandria, and the liberal patronage which learning there received from the Ptolemies, rendered that city the chief resort of men of science from all parts of the world, and the great emporium of literature. In consequence, the Alexandrian school soon eclipsed all the rival seminaries, and produced a succession of eminent physicians; among whom Herophilus and Erasistratus are entitled to the first place, on account of their important contributions to anatomical knowledge. (See their respective articles.) It was in their time, and probably at Alexandria, that the memorable division of the art into three branches took place: "Iisdem temporibus, in tres partes medicina ducta est, ut una esset, quæ victu, altera quæ medicamentis, tertia quæ manu mederetur." (Cels. l. i.) But, however much this distribution of practice was calculated to accelerate the progress of medical science, in all its different parts, it does not appear that the immediate successors of Herophilus and Erasistratus turned the circumstance to great account; though Celsus affirms, that surgery improved rapidly after its separation. Lib. vii. Præf.

Of the establishment and doctrines of the Empirical sect

we have already given a sufficiently minute view under the proper article. We have there shewn how decidedly the principles of this school were opposed to those of the Dogmatists; and that there was something more than a mere dispute of words between them, as some writers maintain. Notwithstanding, however, all their points of variance; notwithstanding the violence and bitter animosity which the contending parties displayed in their controversies; it was found, that when they came to apply their respective principles to practice, and to determine on the treatment of disease, all differences, in a great measure, vanished. Nor was this to be wondered at: for the dogmatists, though they indulged too much in hypothetical reasoning, did not altogether neglect observation, and were consequently more or less guided by the same lessons of experience, on which the empirics founded their therapeutical maxims. The same remark will be found to apply to almost all the sects which have acquired any consequence in the medical world.

In the article last referred to, Heraclides of Tarentum has been mentioned as one of the adherents of the empirical school; but he deviated from the strict empirics in this respect, that he did not neglect the investigation of the hidden and remote causes of disease. His practice in some of the most dangerous diseases, as phrenitis, lethargy, cyananche, tetanus, and cholera, (for the description of which we are indebted to Cælius Aurelianus,) seems to have been highly judicious. To the materia medica he contributed largely: he wrote a treatise on the composition of medicines, in which he observed the praiseworthy maxim of noticing only such remedies as he had administered himself. He is also reported to have possessed no inconsiderable skill in surgery; and, on the whole, he appears to have fully merited the eulogies of Galen and Aurelianus, the latter of which styles him *empiricorum princeps*. After his death, the study of the materia medica took a new direction, in consequence of the attention that was paid to the subject of poisons and their antidotes, by the kings of Pergamus and Pontus. The antidote which was invented by the latter is well known, though its efficacy has never been proved. Even Serenus, who is in general sufficiently credulous, seems to have had no very high opinion of its virtues.

“ Antidotus vero multis Mithridatica fertur
 Confociata modis, sed Magnus serinia regis
 Cum caperet victor, vilem deprehendit in illis
 Synthefin, et vulgata fati medicamina risit.” Cap. ix.

Nicander of Colophon, who was the contemporary of Attalus, king of Pergamus, acquired great fame as a grammarian, a poet, and a physician. Of his works, only the two treatises in verse, entitled *Θεριακκα* and *Αλεξιφαρμακκα*, have been handed down to us. Though not abounding in poetical merit, they display no mean acquaintance with natural history.

The Roman people, as Pliny assures us (xxix. 1.), had continued without physicians, if not without physic, during a period of 600 years. On the occasion of a destructive epidemic, in the year 463 A.U.C. however, they sent a deputation to the temple of Esculapius at Epidaurus. Instead of an oracle, they received one of the sacred serpents, and following the indication of its springing from the ship upon the island of the Tiber, they there founded a temple to the god of medicine, and established his worship on the same footing as at Epidaurus. Shortly afterwards, a temple was dedicated to the Grecian Hygeia, and the worship of Isis and Serapis was borrowed from the Egyptians: but, besides these, the Romans had certain medical deities

quite peculiar to themselves. For example, on the Palatine Mount, there was a temple of the goddess Febris, who probably received divine honours from a prevalent dread of the disease. Tomafini, (in *Grev Thesaur. Roman. Antiquit.* v. xii. p. 867.) has preserved the following inscription of a votive tablet to this goddess:

“ FERRO DIVÆ FERRE
SANCTÆ FERRE MAGNÆ
CAMILLA AMPTA PRO
FILIO MALE AFFECTO P.”

There was also a goddess Ossipaga, who presided over the growth of the bones, and one styled Carna, who took care of the viscera, and who had bean-broth and bacon offered to her, as being the most nutritious articles of diet. (Macrob. *Saturnal. lib. i. p. 123.* ed. Ald.) The goddess Mephitis, who is mentioned by Tneitus, as worshipped at Cremona, had probably the same attributes as Febris.

With respect to the question, which was so warmly debated in the beginning of the last century, (*viz.* Whether the art of physic was exercised by any other persons than slaves, or freedmen, in the earlier periods of Roman history?) we would observe, that the probability is against the supposition, that it was so. Certain it is, that the inferior orders of the profession, those Greeks, for example, who were employed to perform venesection, to extract corns, or draw teeth, were all dignified with the title of *medici*, in the same way as the Jatruliptæ were often styled *ἰατροί*. But that in time they raised themselves above this servile condition, is abundantly proved by the honour of citizenship, and other privileges, which were conferred upon them. Archagathus is the first person who is mentioned as having come to Rome, of his own accord, to practise the art of surgery. The senate decreed him the freedom of the city, and purchased for him a shop in the Acilian crossway; but his cruel operations—“*sævitia secandi urendique*”—soon brought him into disrepute, and eventually led to his banishment. Pliny, *loc. cit.*

In the 654th year A.U.C., or 100 years before the Christian era, Asclepiades, a native of Prusa in Bithynia, who had studied at Alexandria and Athens, came to Rome as a teacher of rhetoric: but not finding that profession sufficiently lucrative, he suddenly turned physician, and by his consummate address, in a short time, brought himself into great notice. The prototype of all succeeding quacks, Asclepiades affected to condemn every thing that had been done before him—“*omnia abdicavit; totamque medicinam, ad causam revocando, conjecturam fecit;*” he ridiculed Hippocrates for his patient observation of nature, and called his system a *meditation on death*, *θανάτου μελέτην*. His fame, however, would have been incomplete, if he had not introduced a system of his own. Accordingly, taking, for the basis of it, the philosophy of Epicurus and Heraclides of Pontus, he attempted to explain all the functions of the human body, and all the operations of health and disease, by means of corpuscles and pores, *ὄγκοι* and *πόροι*. Anatomy was altogether neglected by him. In his practice, he professed to be guided by the maxim *tuto, celeriter, et jucunde*: but though he flattered the caprices of his patients, and soothed their complaints by the blandishments of his rhetoric; yet we learn from Celsus (*lib. iii. c. 4.*), that he subjected them to many severe mortifications; keeping them, for instance, several days without drink or sleep, in the early stages of fever. That Asclepiades, however, possessed no mean talent for observation, is proved by his description of diseases, and by the division of them into acute

and chronic, which appears to have originated with him. The remedies which he employed were chiefly dietetical; but he was no enemy to phlebotomy, though he discouraged vomiting and purgation: instead of the latter he recommended clysters. He was a great advocate for the efficacy of frictions, gelation, and other corporeal exercises; and he sedulously proscribed the use of cold water externally as well as internally; though he probably ingratiated himself with the Romans more by his free admission of wine, in disorders where it had not formerly been allowed. Sprengel supposes him to have been the inventor of the shower-bath, *balneum perfusivum*. Pliny, *xxvi. c. 3.*

Theonson of Laodicea, a disciple of Asclepiades, adopting the leading doctrine of his teacher, founded upon them the Methodic system. He discarded the study of remote causes, the theory of critical days, &c. as wholly useless; and maintained, that all that was necessary for the physician, was an acquaintance with certain general constituents of disease. In his practice he followed the footsteps of Asclepiades, first furnishing his patients, and then endeavouring to obviate the preternatural condition, which he had induced. His success, however, would not appear to have been very great, if we are to credit the insinuation contained in the line of Juvenal,

“ Quot Themison ægros autumnno occiderat uno.”

The object which the Methodic sect had in view, seems to have been the simplification of the theory and practice of the art. The investigations of the Dogmatists respecting occult causes appeared to them to rest on too fallacious grounds; nor were they satisfied with observing the *concurfus symptomatum*, like the Empirics: they therefore steered a middle course between the two, taking for the basis of their theory certain conditions of the system, which are common to different diseases (*quædam morborum communia, κοινοτήτες*); without considering, as Sprengel well observes, that these conditions of the body are as often, if not more frequently, concealed from view, than all the occult causes of the Dogmatists. The earlier adherents of this system contended, that there were two general morbid conditions to which all diseases were referrible, *viz.* a state of *constriction*, and a state of *relaxation*; but they applied these terms not, as it would appear, in the modern acceptation, to particular organs, but to the body at large. Conformably to this view of disease, all that the practitioner had to do, was to find out, in each case, the morbid condition, and to apply his remedies accordingly: if it was a disease of constriction, he prescribed relaxing medicines; and if it was one of relaxation, he employed astringents. But it was very soon discovered, that these two states would not comprehend all diseases: the Methodists therefore invented a third common condition, which they called the *mixed* state. “We may form some idea,” Mr. Cabanis observes, “of what they meant to designate by the term *diseases of constriction*, though it is certainly not so intelligible to men of science, as it appears to the uninformed class; we may also conceive the import of the phrase *relaxed fibres*; but it is difficult to divine, what they could understand by their *mixed species*, or how they could apply to practice this speculative notion, which is so very subtle, as to elude all clear conception. Besides, is it not evident, that almost all diseases belong to the *mixed* class, or may be referred to it? For this word, if it signify any thing, must mean an *irregularity of tone* in the different organs, or an *irregular distribution* of the vital power. Now the majority of diseases present the general phenomenon of a derangement of equilibrium.

brium, or irregular expenditure of living energy. In those cases, in which these deviations from the healthy standard are less obvious, an observing eye may still perceive them; and, perhaps, there is no disease in which a deficiency of equilibrium is not, in some degree, manifested, whether it be in the tone of the different organs, or in the exercise of life, and distribution of the sensibility of the system. Thus then, the *mixed species* of the Methodic sect, by comprehending every thing, becomes, in fact, applicable to nothing." Loc. cit. p. 100.

Notwithstanding the justice of these strictures, it cannot be denied, that the doctrines in question had, in one point of view, a beneficial tendency, viz. by obliging physicians to study more attentively, than they had hitherto been accustomed to do, the different indications of disease. If the Methodists had applied themselves to the investigation of such morbid conditions of the system as were manifested by the symptoms; and if they had not rashly attempted to simplify pathology, by ranging diseases in two general classes, according to characters that were but partially applicable; their school would have conducted still more to the improvement of the science of medicine. As to their mode of practice, it may be observed, that they wholly overlooked the healing powers of the system, and, without regard to the peculiar circumstances of the case, or the nature of the part affected, were solely intent on fulfilling those general indications, that were conformable to their theory. It is true, that they paid particular attention to days; not, however, as connected with the doctrine of crises, for which, as we have already hinted, the founders of this sect entertained a marked contempt; but only as affording them a measure of the duration of the disorder, and a guide for the method of treatment. In the first days, they followed the starving system; afterwards they pursued the supposed general indications of constricting, or of relaxing: during the exacerbation of the disease, they endeavoured to moderate the violence of it; during its decline, they supported the powers of the system by nutritive diet. This was their mode of proceeding in all acute diseases: but, in chronic complaints to which it was less applicable, they had recourse to what they termed the *μετασχημασις*, or *reincorporation*, of which the professed object was to restore the proper relations between the atoms and pores, and for which they prepared the patient by the *ἀναληψις*, or *resumptive circle*. It was, in fact, little else than their practice in acute diseases reversed,—they first sought to strengthen the patient by a generous diet, and then they administered a succession of violent remedies, to subdue the original malady. For the details of this mode of treatment, see Cæli. Aurel. Chron. i. c. 1. ii. c. 13. 29. &c.

Among the disciples of Themison, one Theffalus of Trallis, a man of low birth and coarse manners, made himself conspicuous by the shameless audacity with which he sought to disparage the labours of others—arrogating to himself the title of *ιατρονικης*, or *conqueror of physicians*, and that, it would appear, without the slightest pretensions to either learning or talents. (Plin. l. xxix. c. 1.) He held forth, that he could qualify any one for a physician in the space of six months, and actually succeeded in obtaining a great number of pupils; but it was from among the lowest order of artificers, such as rope-makers, weavers, cooks, butchers, fullers, and such like. These he took with him to visit his patients for the stipulated time, and then he conferred upon them the privilege of practising for themselves. From his time it became the custom for the Roman physicians to visit their patients attended by all

their pupils; in allusion to which, we have the epigram of Martial:

“Languēbam; sed tu comitatus protinus ad me
Venisti, centum, Symmache, discipulis.
Centum me tetigere manus aquilone gelatæ:
Non habui febrem, Symmache: nunc habeo!”

The methodic school acquired much greater repute from the labours of Soranus and Cælius Aurelianus; the former a native of Ephesus, who had studied at Alexandria, and came to Rome during the reign of Trajan; the latter an African by birth. Free from the prejudices, which had disgraced his predecessors, Soranus cultivated the study of anatomy, and wrote a book on the *female organs of generation*, which is still extant, and which displays considerable acquaintance with the subject. Many of his observations on disease shew, that he was possessed of great sagacity and strength of judgment. To Cælius Aurelianus, on the other hand, we are indebted for an account of his doctrines and practice, and for one of the best works on medicine, which have come to us from ancient times; written, it is true, in a barbarous style, but highly deserving of perusal on account of the accurate description of diseases, and the different methods of treatment, which it contains.

Anatomy and the other auxiliary sciences, though they had been so much neglected by the methodists, were now receiving important additions from other quarters. Rufus of Ephesus, who lived in the time of the emperor Trajan, and whose works have been edited by our countryman, Clinch, applied himself zealously to the dissection of animals, particularly of apes, and described from analogy the different organs of the human body. He traced the nerves from their origin in the brain, and divided them into those of sensation and those of voluntary motion; he pointed out the decussation of the optic nerves at the *infundibulum*, and he speaks of the capsule of the crystalline lens, under the appellation *ὑμην φλοκοειδης*. The heart he believed to be the seat of life, of animal heat, and the cause of pulsation, and he shewed the difference of structure and capacity between the right and the left ventricle. The spleen he held to be an useless organ. Marinus, whom Galen calls the restorer of anatomy, and to whose labours he was himself probably indebted for much of his knowledge on the subject, rendered still greater services to the science. He investigated the absorbent system with great care, and discovered the mesenteric glands; he distributed the nerves into seven pairs: the N. palatinus (then called the fourth pair) was first described by him; and he is said to have been the discoverer also of the *par vagum*, which he termed the sixth pair. His numerous writings have all perished.

The study of the *materia medica*, and of the other branches of natural history, was prosecuted with no less vigour; and we owe to this epoch the invention of many remedies, which are still retained in our pharmaceutical systems. The elder Pliny, second only to Aristotle in the universality of his genius, but surpassing even that great man in his insatiable thirst for knowledge, had collected in his *Historia Mundi* all that the ancients knew of natural science. Dioscorides of Anazarba, devoting himself to botany and *materia medica*, produced a work, which served for a guide in these sciences till a very late period. His descriptions of some of the more valuable drugs, such as myrrh, ladanum, assafœtida, ammoniac, opium, squills, and their different preparations, are entitled to great praise. The efficacy of several remedies, which he recommends, has been admirably confirmed by later experience, such as of

the elm-bark in cutaneous diseases, of potash as a caustic, of the male fern against worms, &c. &c. Some of the contemporaries of Dioscorides, as Scribonius Largus, Xenocrates, and Andromachus, cultivated the materia medica, but with less success. To Meneceates, who lived in the reign of Tiberius, and who, according to an inscription in Montfaucon, appears to have been the author of 155 books, we are indebted for the invention of the *diachylon* plaister; and Damocrates is well known as the author of several complicated remedies, which bear his name. Herennius Philo, of Tarsus, is mentioned by Galen as the inventor of an anodyne composition, called, after him, *Philonium*, and which consisted of opium, euphorbium, and different aromatics; and Aselepiades Pharmacion was the introducer of numerous remedies from the animal kingdom, which, though long honoured with a place in our pharmacopœias, have now deservedly fallen into disrepute.

Before quitting this period of medical history, it will be necessary to say a few words respecting two other sects, which arose soon after the establishment of the methodic school: we mean the Eclectic and Pneumatic sects. The founder of the latter, Aristæus of Cilicia, flourished as a physician at Rome about the middle of the first century, and distinguished himself by his opposition to the tenets of Aselepiades, and his attachment to the Stoical system: he extended the theory of pre-existent germs; treated the doctrine of the pulse with dialectic subtlety, referring its varieties to the exhalation of the *πνευμα* from the heart and arteries; and cultivated several branches of pathology; but was more successful in his dietetical researches, particularly with respect to the influence of the atmosphere. His pupil Agathinus, endeavouring to reconcile his principles with those of the methodic and empiric sects, acquired the name of the Episyntetic or Eclectic, and thus established the Eclectic system, on which, however, he does not appear to have conferred much repute by his own labours. That merit was reserved for Archigenes and Aretæus, who, adopting the leading tenets of the Pneumatic theory, gave it a more scientific form, and enriched it by many valuable observations. The former attempted to reform the language of medicine, but without much effect; for even Galen has occasion to complain of the obscurity of his phraseology; he was, besides, too fond of subtleties: but many of his practical observations, which Galen has recorded, are excellent. The merits of Aretæus, as a skilful and attentive observer, and as an elegant describer of disease, are familiar to every one. To Cassius, the Jatrophiist, another Eclectic, we are indebted for many valuable pathological remarks concerning the diseases of association, and the sympathies of the nervous system.

During this period, surgery received considerable improvement; particularly from the labours of Heliodorus and of Antyllus. Of the former, who was an eminent surgeon at Rome, in the time of Trajan, Nicetas has preserved several practical observations, on injuries of the head and diseases of the bones, which evince no mean proficiency in his art. The latter is perhaps still more deserving of notice, as being the first who gives any account of the extraction of the cataract: he recommends this operation to be performed while the cataract is small, being of opinion, that, when enlarged, it cannot be extracted without bringing the humours of the eye along with it. (Rhaz. Continent. lib. ii. c. 3.) His directions concerning the preparation of plasters and ointments, and concerning the choice of veins in phlebotomy, are very minute. In dangerous cases of cyanache, he advises bronchotomy; and in *hernia humoralis*

he operated by incision. Philagrius, who lived about the time of Valens, appears to have been the first who attempted to extract a stone from the bladder by the high operation. (Aët. *Tratrab.* iii. f. iii. c. 5.) The last quoted author has also transmitted to us an account of the surgical practice of one Leonides of Alexandria, whose observations on hernia, scrofula, and glandular swellings, on ulcers and warts of the genital organs, on hydrocele, and on inflammation of the scrotum, shew considerable discernment. In cancerous affections of the breast, he resorted to amputation, and the actual cautery; in *fistula*, his method of operation differed but little from that recommended by Pott.

The art of medicine was advancing thus rapidly in all its branches, when Galen appeared, a man of signal talents, who soon outstripped all his competitors in the profession, and divided with Hippocrates the admiration of the medical world. "Endowed with a genius sufficiently comprehensive to embrace all the sciences, and to cultivate them all with equal success," if we may borrow the language of Cabanis, "he, even in early infancy, gave proofs of uncommon capacity; and while pursuing his youthful studies, began to perceive the futility of the prevailing systems. Dissatisfied with what his masters taught him as incontrovertible truths, and as the immutable principles of the art, he read Hippocrates' works, and was struck, as it were, with a new light. In comparing them with Nature, his astonishment and admiration redoubled; and Hippocrates and Nature thenceforth became the only preceptors to whose instructions he would listen. He undertook the task of commenting upon the writings of the father of medicine; he presented his opinions in various lights, in which they had not hitherto been regarded; he repeated his observations, he extended them, and supported them with all the aids which philosophy and physics were capable of affording them, either by the simple comparison of facts, or by the collation of different theories, or, finally, by the combination of different methods of reasoning. In short, Galen revived the Hippocratic system of medicine, and communicated to it a lustre, which it did not possess in its primitive simplicity. But, at the same time, what it gained in his hands, must be allowed to have more the appearance of dress and ornament, than of real solid acquisition. The observations which had been collected, and the rules which had been laid down by Hippocrates, in assuming a more splendid and systematic form, lost much of their original purity; nature, whom the Coan physician had always followed with so much accuracy and caution, became obscured, and, as it were, stifled, by the foreign pomp of various sciences and dogmas; and the art of medicine, overcharged, as it already was, with subtle and superfluous rules, became entangled in a number of new and unnecessary difficulties." Q. c. p. 113.

Though possessed of more extensive erudition than either Hippocrates or Aretæus, Galen was decidedly their inferior as a pathological observer; not, however, so much from any defect of his mental powers, as from his attachment to false theory. It was on the pseudo-Hippocratic doctrines, particularly as developed in the book *περι φυσικης αιδρωτου*, that he founded his system. Although, therefore, he professed to follow Hippocrates, he did not always follow him in his genuine spirit. But all the departments of the art have been enriched by his labours: to anatomy and physiology, in particular, he made many useful additions by the information which he collected in his travels, and by his assiduous dissections of the inferior animals. For the history

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of his life and writings, and for an account of the system which took its name from him, see GALEN and GALENICAL *System*.

Unfortunately the exertions of Galen, to preserve the science in the path of improvement, were not seconded by his immediate successors. During a period of thirteen centuries, medicine remained nearly stationary, and, in some instances, assumed even a retrograde course. The best writers who appeared among the Greeks, such as Oribasius, Aëtius, Alexander Trallianus, Paulus Ægineta, Nicetas, &c. contented themselves, in a great measure, with the merit of compilation; while among the eastern nations an unnatural union was attempted between medicine and the favourite studies of magic and astrology. The Arabians, from their vicinity to Alexandria, from their intercourse with the sect of Nestorians and with the Greek philosophers, who had been compelled by the persecution of Justinian to take refuge in the Mahometan states, had acquired a taste for literature and the sciences. About the commencement of the seventh century, the works of several of the Greek philosophers and physicians were translated into Arabic, under the patronage of the caliphs; several of whom were zealous encouragers of learning. In the eighth century, the caliph Almanfur established an academy and hospitals for the sick at Bagdad, which soon became so great a resort for men of letters from all parts of the world, that, as Leo Africanus assures us, it at one time contained six thousand. His successor, Harun-Arraschid, patronised the medical school of Jondisabur, the teachers in which were chiefly Nestorians; and both he and Almanfur were unremitting in their exertions to procure translations from the Greek, and the settlement of men of science in their dominions. But it was in Spain that Arabian learning rose to the highest pitch, and produced the most brilliant fruits. The university of Cordova, which had been founded by Alhakem, became the most celebrated in the world, and maintained its repute for a long course of years. As early as the tenth century, Cordova could boast of the largest library in the West; a library of 250,000 books, and of which the catalogue is said to have filled forty-four volumes. In the twelfth century, there were no less than seventy public libraries in Spain: Cordova had produced 150 authors, Almeria 52, and Murcia 62. At Seville, at Toledo, and at Murcia, academies were also established, which continued to flourish during the whole period of the dominion of the Arabians.

Notwithstanding these numerous incitements to learning, notwithstanding the multitude of authors which they produced, the labours of the Arabians in the field of science were attended with but small fruits. Worshipping the authority of Aristotle and of Galen, they consumed their time in commenting upon these writers, and neglected the path of individual observation and experiment. To anatomy they contributed nothing; the tenets of their religion forbade all attempts at dissection; and the only thing they ventured upon was the inspection of the skeleton. Their pathology, though disfigured by numberless extravagances, was enriched by the description of some new diseases, particularly of the small-pox, which, according to the Arabian writers, broke out about the year 558, and of which the first account was given by Ahrun, the author of a work in the Syriac tongue, intitled "Pandects." Their practice, in as far as it deviated from the Grecian model, was miserable quackery. The only improvement deserving of notice was the introduction of lenitive medicines, in the place of drastic purgatives, which had been too freely employed by the Greeks. A predilection for the wonderful led them to

cultivate with great assiduity the arts of astrology and uroscopy, and to deliver their judgments with all the airs of prophesying. National prejudices, and a false delicacy, prevented their making any progress in surgery; and Albucaasis had much reason to complain of the ignorance of his countrymen in that department of the science. In the auxiliary arts of chemistry and pharmacy they were more successful. The former had been cultivated by the later Alexandrians, principally with a view to the transmutation of metals; an art which seemed to possess great attractions in the eyes of the Arabians, and to which they accordingly applied themselves with eagerness. Geber, who lived in the commencement of the eighth century, and who is said to have been the first alchemist of his nation, seems to have been acquainted with various preparations of mercury, such as corrosive sublimate and red precipitate, with the nitric acid, aqua regia, &c. Pharmacy was an object of still greater attention among them; and the Arabians have the credit of having set the first example of publishing regular dispensaries, or collections of authorized formulæ. The first pharmacopœia was the production of one Sabon-ebn-Sahel, head master of the academy of Jondisabur, and appeared towards the end of the ninth century, under the title of "Krabadin." The shops of the Arabian apothecaries were placed under the immediate superintendance of the magistracy, who took care that they should be provided with genuine drugs, and that these should be sold at a reasonable price. Many of the pharmaceutical terms still employed are of Arabian origin, *e. g.* alcohol, naphtha, camphor, julep, syrup, &c. &c. For a more particular account of Arabian medicine, see Sprengel, G. d. A. Th. ii. f. 324—450 (2le Augs.): the modes of practice have been sufficiently described by Freind.

If the Mahometans, generally speaking, contributed little to the improvement of the science, they have yet more claims on our gratitude than the Christian professors of the art during the same period. To the former we owe, in some measure, the preservation and diffusion of the writings of the Greek physicians: the latter did every thing in their power to degrade the profession, and bring it back to its condition in the most barbarous times. The clergy, actuated by avaricious motives, seized upon the province of the physician, and the most ignorant priests and monks ventured upon the practice of medicine, without any proper study or preparation. At length the evil became too crying to be any longer endured; and the first Lateran council, held in 1123, forbade the regular clergy to visit any longer the sick. The prohibition was repeated, in other terms, by the council of Rheims, in 1131, and by the second general Lateran council in 1139; and those monks and canons, who applied themselves to physic, "*ordinis sui propositum nullatenus attendentes, pro detestanda pecunia sanitatem pollicentes,*" were threatened with severe penalties, and all bishops, abbots, and priors, who connived at their misconduct, were ordered to be suspended from their ecclesiastical functions. "But the French priests and monks," says Cabanis, "bade defiance to these thundering anathemas; and it was not till three hundred years after, that common sense and a regard to propriety and the public good, triumphed finally over their artifices. A special bull, procured by the cardinal d'Eltonville, which permitted physicians to marry, effected their complete separation from the clergy; and, by this means alone, put a stop to a variety of shameful abuses." To the honour of our own country, however, be it mentioned, that these abuses do not appear to have prevailed to such an extent among us; but that, on the contrary, England could reckon many scientific men among its clergy, even as early

as the seventh and eighth centuries, whose fame was so great as to procure them the chief literary appointments abroad. The learned society, which was formed at the court of Charlemagne, consisted chiefly of Britons, with the celebrated Alcin at their head; and it would appear from the verses of the last-mentioned personage, that the members practised medicine:

“ Accurrunt medici mox Hippocratica testæ;
 He venas fundit, herbas luc miscet in olla,
 Ille coquit pultes, alter sed pocula presert.”

Carmin. 228.

The Benedictine monks of Salerno, in the Neapolitan territory, after having exercised the art for several centuries, according to the taste of the age, and performed many miraculous cures with the relics of St. Matthew and other holy persons, betook themselves to the study of the Arabian and Grecian writers on physic, but especially of Galen, whom they esteemed the prince of physicians; and by their successful labours procured for their residence the title of *Civitas Medicinæ*. In the twelfth century, Salerno arrived at its highest fame; and was much frequented by the crusaders in their passage to and from the Holy Land. Among these, Robert, the son of William the Conqueror, had the honour of having the well-known “*Regimen Sanitatis Salerni*” dedicated to him. In the year 1142, the emperor Frédéric II. conferred particular privileges on the school of Salerno, and regulated the course of studies, and the probation which physicians and surgeons should undergo before they were permitted to practise. Many of the ordinances shew great judgment. The Salernian school continued accordingly to flourish till the middle of the fourteenth century, when it appears to have begun to decline. “*Fuisse Salerni*,” says Petrarch, “*medicinæ fontem fama est; sed nihil est, quod non semo exarefecat.*” Gariopontus, Nicolaus, Ægidius, Enos, and John of Milan, the author of the “*Regimen Sanitatis*,” are the chief writers whom this school boasts.

Medicine was now generally taught in the universities of Europe, among which those of Montpellier, Paris, Bologna, Padua, Ferrara, Pavia, Milan, and Piacenza, were the most distinguished; but it was taught in a slavish spirit of adherence to the dogmas of Galen and Hippocrates, and, what was still worse, in combination with the scholastic philosophy. In 1271, the College of Surgeons at Paris was established by Pitard, a man who, according to Quésnay, was born for the advancement of his art; and surgery was henceforth cultivated with much success in France, as a distinct branch of the profession. Several writers on physic appeared in England; among whom Gilbert has the merit of having furnished the best description of the leprosy of the middle ages; but he trod in the footsteps of the Arabians, and gave into the scholastic style. The same remark applies to his successors, John of St. Giles, Richard of Windermer, Nicolas Farnham, John of Gaddesden, &c. It was in Italy that medical science was revived in the truest spirit. In the year 1315, Mondini de' Luzzi, professor at Bologna, astonished the whole world, to use Vieq d'Azyr's expression, by the public dissection of two human bodies. His example was followed in other universities; but the utility of the practice was in a great degree frustrated by the predilection for ancient opinions, which made the anatomists of the age less anxious to discover facts, than to reconcile the appearances which they observed with the dogmas of Galen and Avicenna. An absurd bull of pope Boniface VIII. forbidding the maceration and preparation of skeletons, also concurred to impede the progress of anatomy (Blumenbach, *Hist. Med. Litterar.*

p. 99.); but from this time forward, the Italian professors maintained a high repute for anatomical science, and have ranked among the most zealous contributors to our knowledge of the human frame.

Though the crusades had conferred no direct benefits on science, but, on the contrary, had tended to prolong the reign of prejudice and folly, they had given a new impulse to the human mind, by the spirit of commerce which they excited. They were also the occasion of the rapid spreading of leprosy and some other diseases in the West, and of the consequent increase of institutions for the relief of the sick, after the example of the Oriental nations. Several orders of knighthood, as the Templars, the knights of St. John, of St. Lazarus, the *Hospitalarii Sancti Spiritus*, &c. were founded with this charitable view; the members devoting themselves to the cure of such pilgrims as were afflicted with disease.

In the fifteenth century several new diseases appear to have invaded mankind, or, at least, to have attacked them with a degree of violence that was before unknown; such as the hooping-cough, which was epidemic in France in the year 1414, and which, according to Mezeray, attacked all descriptions of persons, even the oldest men; the sweating sickness, that broke out first in 1486; the scurvy, of which some traces had been observed in earlier times, but which became much more common, perhaps in consequence of the greater frequency of sea voyages about this period; and, lastly, the venereal disease, the origin of which we shall investigate in a separate article. The rules of the ancients proving but little applicable to the treatment of these complaints, physicians began to doubt the infallibility of these guides, and to perceive the necessity of observing and judging for themselves. Nor was the influence of the revival of letters, and the great events by which it was followed, lost upon medicine. But, unfortunately, the taste for astronomical studies continued to prevail, and to obstruct the progress of the art in all its branches. The auxiliary sciences received little improvement during this epoch.

The very general attention which was now paid to classical literature in the universities of Europe contributed to the restoration of the Hippocratic system of medicine. Among the Italians, Leonicensus and Masardus laboured to expose the errors of the Arabians, whom the latter justly designated as *ex commentario medicos*; among the Germans, Fuchs, Koch, Winter, and Hagenbut, made known to their countrymen the merits of the Greek physicians, by their translations and commentaries; and a similar service was performed in this country by Linacre and Caius. The Parisian school was still more zealous in the cause; Houliet, Duret, and Gorræus, elucidated the doctrines of Hippocrates with much success; and Foësius produced an edition of his works, which even at this day ranks as the most accurate and the most complete. Medical literature was still farther enriched by the magnificent collections of pathological observations, which the industry of Dodonæus, Schenckius, Forestus, and Platerus accomplished. A controversy respecting the mode of performing venesection in pleurisy, was begun in the early part of the sixteenth century by Brissot, a physician of Poitou, who observing the good effects of abstracting blood as near as possible from the seat of inflammation, had the courage to oppose the Arabian method, and to revive the Hippocratic practice. This important innovation, however, was opposed by the physicians of the time with great warmth, and continued the subject of violent dispute till the anatomical discoveries of Vesalius, Faloppia, and Amatus, turned the scale in Brissot's favour. The credulous and superstitious character of the age, however, was still opposed to any great improvement in the art of observing and curing disease:

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disease: physicians were more anxious to collect what was wonderful than what was useful; their practice was directed chiefly by the theory of the elementary qualities, and was disfigured by many remnants of the barbarous ages. The best observer which the sixteenth century produced was Jodocus Lommius, the author of a classical work on the cure of continued fevers, and of "Three Books of Medical Observations."

Though the futility and absurdity of astrological science had been successfully exposed by Picus of Mirandola, Marlianus, and Paulus Florentinus, yet it continued to be pursued with unabated ardour, and to obtain many votaries, among men of otherwise great judgment and learning. Even those who evinced the greatest contempt for this nugatory art, could not divest themselves of a partiality for studies of an equally frivolous nature. Of this weakness we have a remarkable instance in Picus of Mirandola himself; who, after combating astrology, applied himself to the study of the Cabbalistic philosophy. The belief in the influence of demons, the efficacy of magic, and the powers of witchcraft, became very prevalent throughout Europe, and perhaps in no part of it to a greater degree than in England, which acquired the repute of being the country of witches. Even the illustrious Luther was so completely biassed by the prejudices of his age, that he ascribed the majority of diseases to the arts of the devil, and found great fault with physicians, when they attempted to account for them by natural causes. Alchemy had been hitherto cultivated only by the most illiterate men; but the introduction of theosophism and the cabbalistic art brought the study into great vogue, and it was thenceforth profecuted with much eagerness by the monks and wandering scholastics (*scholastici vagantes*), under the patronage of kings and princes, who fondly hoped to augment their revenues by the products of this art. Though a law was passed by Henry IV., condemning as impostors the alchemists, who were then very numerous in England, yet they contrived to maintain their ground; and practised so adroitly on the weakness of his successor, Henry VI., that this monarch, finding his treasures exhausted by the unfortunate wars in which he had engaged, granted to certain transmuters of metals the privilege of making gold, and preparing the elixir of life. (Henry's Hist. of G. B. b. v. ch. iv. § 7.) The labours of Basilus Valentinus, the reputed author of the "Curus Antimonii Triumphalis," and of Isaac le Hollandois, were rather more usefully directed; but it was reserved for Paracelsus to appropriate to himself all the knowledge which his predecessors had attained in this branch of learning, and to apply it with success to medicine.

It has been too much the fashion to ridicule this singular man, and to overlook his merits as one of the great reformers of our art; though it must be acknowledged, that the extravagance of his pretensions, his insolent behaviour, and his dissolute manners, afford strong grounds for much of the contempt with which he has been visited. The early education of Paracelsus, or, as he called himself, Philippus Aureolus Theophrastus Paracelsus Bombast von Hohenheim, would appear to have been greatly neglected: and, notwithstanding his asseveration, that he had been at German, French, and Italian universities, it is sufficiently evident from his writings, that he could never have enjoyed the benefit of proper classical instruction. From his father, who is said to have been a physician, he obtained a smattering of medicine, astrology, and alchemy: he afterwards served as surgeon in several wars, and visited most of the countries of Europe, seeking information not only from physicians and other men of learning, but from old women, from the gipsies, and from con-

jurers. From these he boasts of having learned the preparation of several valuable remedies: from his intercourse with the miners, he became acquainted with various processes for extracting metals. Returning to Germany, he soon acquired great repute by his cures, and was believed to have discovered the elixir of life. In the year 1526, his increasing fame procured him the appointment of professor of medicine and surgery in the university of Basle; where he commenced a course of lectures on the theory and practice of physic, in the German language, and succeeded in attracting a considerable audience, but chiefly from among the dregs of the people, who, seduced by his vauntings, were eager to obtain the knowledge of his secrets. He began by burning the works of Galen and of Avicenna, in his auditory, assuring his hearers "that his shoe-latchets possessed more knowledge than Galen and Avicenna; that all the academics of the world had not so much experience as his beard; and that the hair of the back of his neck was more learned than the whole tribe of authors." The lectures, however, which he delivered, consisted of little else than the recommendation of a number of empirical remedies, of the infallibility of which he spoke with much assurance. But his disciples soon became disgusted with him, on account of the drunken irregular life which he led; and though he still continued to perform many wonderful cures, his fame as a practitioner began to decline, and a dispute with the magistracy compelled him suddenly to quit Basle, and to take refuge at Alsace. He, however, did not settle there, but continued to lead a wandering life through different parts of Germany and Switzerland, till the year 1541, when he died at Salzburg, in the hospital of St. Stephen.

The obscure and barbarous style in which the writings of Paracelsus are composed, has rendered it a matter of great difficulty to give a clear account of his speculative opinions. Even the indefatigable Henfler (*Geschichte der Luftfeuche*, f. 120.) complains, that it was with him the business of several months to unravel the confusion of his system. Certain, however, it is, that there never was a more glaring example of the error to which chemists have been ever prone—that of carrying into other sciences what Bacon appropriately calls "the smoke and tarnish of the furnace." The elements of the living system he fancied to be the same as those of his laboratory; and sulphur, salt, and quicksilver, were, according to Paracelsus, the constituents of all organized bodies. They were combined by chemical operations, and their relations were governed by the *Archeus*, or demon, who performed the part of alchemist in the stomach, who separated the poisonous from the nutritive part of the food, and who communicated the tincture by which the food became capable of assimilation. This governor in the stomach, this *spiritus vite*, this *astral body* of man, was the immediate cause of all diseases, and the chief agent in their cure; yet each member of the body was supposed to have its peculiar stomach, by which the work of secretion was effected. Diseases were produced by certain influences, of which Paracelsus reckoned five, viz. *ens astrale*, *ens veneni*, *ens naturale*, *ens spirituale*, and *ens deale*. When the archeus was sick, putrefescence was occasioned, and that either *localiter* or *emunctorialiter*. *Tartarus*, or a certain morbid matter, was the cause of all disorders, exhibiting a viscidness of the fluids, rigidity of the solids, or a concretion of earthy matter, and was believed to be secreted when archeus operated in an irregular or too potent a manner, and digestion was too fully performed. Such speculations, considered abstractedly, are no doubt very absurd; but when divested of the cabbalistical jargon in which they have been enveloped, they will be found to contain a certain portion of truth. Of so great value have

have the views of Paracelsus respecting the functions and diseases of the digestive organs latterly appeared, that they have been revived with little alteration, though clothed in a new dress, by a writer at the commencement of the nineteenth century, in a treatise "On Disorders of the Stomach."

The best and most original of Paracelsus' works is his treatise, in three books, on the venereal disease, entitled "Von den Imposturen in den Franzosen;" in which he has given a minute description of the various forms of syphilis, and shewn in what manner other disorders were liable to be modified by its presence; and in which he has successfully exposed the errors, or, as he terms them, "impollures," of the then prevailing practice. Instead of the inert fumigations, quintessences, and diet drinks, which were in vogue, he recommended mercury as the only remedy on which dependence could be placed, and exhibited it both internally, and by the way of friction. Medicine, in general, was indebted to him for the free introduction of this and other mineral remedies, and of opium, and for pointing out the necessity of attending to chemical actions in pharmaceutical operations. To complex prescriptions he was no friend, and he ridiculed with considerable effect the absurdity of imagining, that 40 or 50 simples in a compound would all retain and exert their separate virtues. The treatment of wounds and ulcers received great improvement at his hands, and his observations on the *balsam* (coagulable lymph), by which he supposed nature to effect their cure, display no small degree of discernment. His confidence in his *arcana* led him to condemn the use of cauterizing instruments, and even to reject the employment of sutures.

The *anatomy of Mundini* was fervently followed as a textbook in all the universities of Europe till towards the middle of the sixteenth century, when the discoveries of Achillini, Berengar of Carpi, Serveto, Sylvius, and Eustachius, but, above all, of Faloppia and Vesalius, threw a new light on the science, and established it on an unalterable basis. Galen was no longer appealed to on doubtful points; on the contrary, anatomists seemed to vie with each other in exposing his errors, and in multiplying the proofs of their observations, by repeated dissections. The structure of the organ of hearing, and other parts of the osseous system, which had escaped the notice of the ancients, was now fully investigated; the arrangement and formation of the muscles were examined, and the mistake of supposing them to consist of an union of tendinous and nervous fibres was satisfactorily confuted; the nerves were traced from their origins, and the base of the brain was minutely described. But it was in respect to the vascular system, that the most brilliant and fruitful discoveries took place. Berengar, who had paid great attention to the structure of the heart, conjectured the right use of the semilunar valves. So early as 1547, Cannani and Amatus had observed the valve at the termination of the vena azygos; but they had not turned the discovery to account; and it was reserved for Fabricius of Aquapendente to prove the presence of valves throughout the whole course of the veins. Five years afterwards, the circulation of the blood through the lungs was imperfectly described by Servetus, who had availed himself of the researches of Berengar and Vesalius. In the year 1571, Cæsalpini had the merit of stating it more clearly, and even of suggesting the first hint of the greater circulation (De Plantis, lib. i. c. 2.); but the full honour of the latter discovery, at least of its complete demonstration, must be ascribed to our countryman, Harvey. See CIRCULATION.

It is sufficiently apparent, even from the above imperfect account, that nothing but a succession of fortunate events

could ever have brought about this great improvement in physiological science. "The discovery of the circulation of the blood was one of those occurrences, which, to use the language of Bacon, "are more the birth of time than of genius;" and, though the merit of it could only belong to a man of transcendent talents, yet we rather detract from, than add to the glory of Harvey, by supposing him to have hit upon it by chance, unguided by the light which he had received from the instructions of his predecessors and contemporaries. We may also observe, that the beneficial consequences of the discovery in question have been greatly overrated, at least as far as practical medicine is concerned; and, in this point of view, we cannot help subscribing most fully to the opinions of a writer, whom we have had frequent occasion to quote. "The new light," Mr. Cabanis remarks, "which was thrown upon the animal economy by this important discovery, served only, in a manner, to redouble the rage of systems. Nothing else was thought of, but to cause the blood to circulate more freely, to destroy its viscosity, to draw off from the body that which was supposed to be corrupted, to purify it, correct it, and renew it, and to preserve the blood-vessels in a relaxed and pervious state. Hence those torrents of aqueous and diluent drinks, with which Bontekoe and his adherents deluged their patients. Hence that sanguinary fury, which the partisans of Botalli thought themselves entitled to exercise in their treatment of all sorts of diseases; a fury which, though so often damped, in some measure, by systematic murders, has ceased only for intervals, and still from time to time re-appears in the schools. Hence, too, that wretched mania of the transfusion of blood, of which the practice almost always deprived those who had the temerity to subject themselves to so dangerous an operation, of their reason, or their lives.

"Thus, one of the most beautiful discoveries of modern medicine, far from elucidating the practice of the art, as there was every reason to expect, only had the effect of misleading weak imaginations, dazzled by its splendour; and it may still be doubted, whether its application to the knowledge and cure of internal diseases has been of any real use. In surgical cases, even where its assistance is generally regarded as indispensable, might not observation almost always supply its place? And must we not limit its importance to the elucidation of a point in anatomy and physiology, very curious, no doubt, in itself; but which, if it did not indirectly affect many other interesting questions relative to the animal economy, would probably have contributed very little to our knowledge of its true laws?" Loc. cit. p. 166—8.

A system that is founded on mysticism, and clothed in obscurity of language, is sure to find numerous votaries. Accordingly, the doctrines of Paracelsus, notwithstanding the opposition of Eraſtus, Deſſenius, Libavius, and others, continued to attract adherents in all the countries of Europe, but particularly in Germany. They were eagerly embraced by the fraternity of Rosicrucians, among whom our countryman, Fludd, made himself conspicuous by his uncommon proficiency in cabbalistical and alchemical learning. But of all the followers of Paracelsus, Van Helmont was the only one who could be said to tread successfully in the footsteps of his master; attacking vigorously, on the one hand, the Galenical system; and labouring, on the other hand, with unremitting zeal in the prosecution of chemical research. Though misled in his speculations by a strong bias to theosophism, he must be allowed to have shewn himself, on many occasions, a skilful observer of nature: he was the first who pointed out distinctly the influence which the epigastric organs exert upon the other parts of the system,

system, in health as well as disease; he determined the nature and cause of inflammation more accurately than any of his predecessors had done; he gave the first satisfactory explanation of the origin of calculi; he exposed the absurdity of the prevailing theory of putrefaction of the blood; and he placed in a strong point of view the pernicious consequences and the dangers of excessive blood-letting. Chemistry owes to him the discovery of carbonic acid and hydrogen gas, and the first investigation of their properties. In his practice he made great use of calomel, of antimony, wine, and opium; and it is somewhat remarkable, that with regard to the virtues of the last mentioned remedy, he in some measure anticipated the Brunonian doctrine; for he maintained that opium was not to be considered as a *refrigerant* medicine, but as a *tonic* and *anodyne*. The utility of Van Helmont's labours, however, was lessened by his attachment to the Paracelsian phraseology; and, as his works were not published till a considerable time after his death, when other systems had come into vogue, his doctrines had few adherents, at least in their original state.

We have already had occasion to observe the influence which the prevailing systems of philosophy have exerted on medicine. In no period of medical history was this influence greater than in that of which we are now about to treat: in no period has it been productive of more marked effects. From the revival of letters to the commencement of the seventeenth century, Aristotle had continued to be the great authority of the schools; dialectic studies were considered as the best preparative for all the other branches of learning; and natural philosophy, in particular, was confined within very narrow limits by its union with the scholastic discipline. Some philosophers, it is true, had stumbled, as it were, on the proper road of its investigation, and, freeing themselves from the slavish admiration of received opinions, had prosecuted, with considerable success, their inquiries in several departments of physical research: but the slow and uncertain advances which they made, prove, that their march was wavering and their footing insecure; that they had soon deviated from the path, and had never discovered its whole extent. It was reserved for the genius of Bacon to point out the various sources of error, by which they had been misled; to demonstrate the true end and use of all scientific inquiry; to shew the only method by which it could be successfully pursued; and to deliver the code by which the study of nature must be thenceforth conducted. Embracing in his comprehensive mind the whole circle of human knowledge, he saw that in medicine much remained to be accomplished; and recalling the attention of physicians to the proper objects of investigation, he inculcated the necessity of a strict adherence to the path of observation and experiment, as the only way by which their art could be improved. By this recommendation, he justly remarks, that he was only enforcing the example of Hippocrates, which had been too long neglected; but his views were more correct and enlarged than those of the father of physic, and more fully adapted to the existing condition of the science, or rather, to speak more accurately, to its future progress; for it has been only in very late times, that some of the more important *desiderata*, which Bacon indicated, have been completely realized; as, for instance, his directions concerning the prosecution of morbid anatomy, and his suggestion of "an imitation by art of natural bathes and medicinable fountains &c." Medical science, however, has profited much less than it ought to have done by the labours of this truly great man; his writings were for a long time neglected; and, even at this day, though we talk of the reform in the method of investigation which Bacon introduced, the undi-

gested knowledge and crude speculations of too many of our physicians demonstrate, that they neither observe his model, nor fully comprehend his precepts. Till the present age, Baglivi appears to have been the only writer who knew how to appreciate the importance of the "*Novum Organum*" as a guide in medical inquiries; but his unfortunate predilection for the chemico-mechanical theory, led him too often to forget the maxims to which he had given his cordial assent, and to commit those very errors which in others he had severely reprehended.

The efforts of Bacon to overthrow the Aristotelian philosophy were powerfully seconded by Descartes. As the opinions of the latter found a much readier reception among the learned, especially on the continent, than those of our illustrious countryman, they accordingly had a more immediate operation, and impress their character more distinctly on the speculations of the age; but their tendency was in many respects injurious to the interests of medical science. Adopting some of the most objectionable parts of Van Helmont's system, particularly the doctrine of fermentation, and combining them with his own hypothesis of vortical motion, Descartes attempts to explain all the chief functions of the living body on chemico-mechanical principles. Thus, the circulation of the blood and animal heat were produced by the ebullition or fermentation that took place in the heart; digestion was likewise performed by a species of fermentation; and the sensation of hunger proceeded from the acid which was evolved during the process. To explain the nature of secretion, Descartes had recourse to the corpuscular philosophy; comparing the secreting organs to sieves, which allowed only the more minute and homogeneous particles to pass through, while the coarser and heterogeneous bodies were rejected;—the round particles were supposed by him to enter into cylindrical tubes; pyramidal particles penetrated by triangular pores, and cubical particles by square pores; and in this way each secretion remained distinct, at least in the healthy state. These ideas were eagerly embraced by the Dutch physicians of the time, and may be considered as forming the groundwork of the chemical and mechanical systems, which divided the medical world at the end of the seventeenth century, notwithstanding the claims to originality which several of their followers have put in.

If the importance of the chemical system of medicine were to be estimated by the portion of good which it has effected, its history might be brought within a very small compass; but if it should be viewed as one of the chief impediments to the free progress of the art, which so many circumstances had conspired to favour; if it should be considered in relation to the mischievous bent which it gave to medical speculations, and, above all, in relation to the fatal errors of practice which it countenanced; few systems would appear entitled to more serious notice. Its first and great supporter was Francis de le Bœ Sylvius, a man of no mean talents, a skilful anatomist, and the first institutor of clinical lectures in hospitals. Though he perceived the full value of experience in medicine, and strenuously inculcated the necessity of subjecting all theories to its test; yet he allowed himself to be dazzled by the glare of opinions, which not only were not confirmed by experience, but which were, for the most part, in direct opposition to its lessons. Fancying that all the operations of life might be explained by a few chemical principles, he could discern nothing but fermentations, ebullitions, and combustions, in the different organs of the body, except, indeed, that he supposed the animal spirits to be produced by a distillation in the brain; diseases were referred by him to an excess of either acid or alkali

alkali in the fluids, to which he gave the name of *acrimony*, and the consequent inspissation or attenuation of the blood and lymph; and they were to be cured only by neutralizing the morbid cause. Thus, he sought to correct the acrimony of the bile by opium and other narcotic remedies; in intermittent fevers, which he believed to proceed from the acid acrimony of the pancreatic juice, he administered the *sal succini volatile* and opium; and in malignant fevers, which he ascribed to an alkaline acrimony and attenuation of the humours, he gave acids, ethers, opium, absorbent earths, and cordials,—paying no regard to the different stages of the disorder, or the character of the prevailing epidemic; but solely intent on fulfilling the indications of his mistaken theory. In this way, the practice of medicine may be said to have commenced a retrograde march, from which it long suffered, and from the injurious consequences of which it has scarcely yet entirely recovered.

After a slight opposition, the doctrines of Sylvius were almost universally adopted. In England, indeed, they experienced some modification, without becoming more rational, as we have elsewhere shewn (see *HUMORAL pathology*); and in Italy, where mathematical studies had acquired the ascendancy, though they were received by many, yet they never obtained that exclusive sway which they enjoyed in other countries. The professors of Paris and Montpellier, refining upon the Helmontian and Cartesian hypothesis, divided the fermentations of the fluids into several distinct species; attempted to account for their production by the admixture of the animal spirits from the brain; and formed a classification of fevers into *fevres chylouses*, and *fevres sanguines*. Attempts were even made, and with apparent success, by Viridet, Vieussens, and others, to demonstrate, by experiment, the presence of alkali in the bile, and of acid in the blood, in the pancreatic and gastric juices. But it was in Holland and Germany that this system had its most bigotted votaries, and was pushed to the most absurd and pernicious extreme. Thus one physician conceived, that acidity was the sole and universal cause of disease; another affirmed, that gout originated from the effervescence of the synovia of the joints with the vitriolated blood, and recommended alcohol for its cure; while a third deduced all disorders whatever from inspissation of the fluids, and expatiated on the sovereign efficacy of diluent drinks, especially of tea. “Tea,” says Bontekoe, who is loudest in his praises of this panacea, and who, as Blumenbach remarks, deserved to have been pensioned by the East India Company for his services,—“tea is the best, nay the only remedy for correcting viscidities of the blood, the source of all diseases, and for dissipating the acid of the stomach; as it contains a fine oleaginous volatile salt, and certain subtle spirits, which are analogous in their nature to the animal spirits. Tea fortifies the memory and all the intellectual faculties: it will therefore furnish the most effectual means of improving physical education. Against fever there is no better remedy than 40 or 50 cups of tea, swallowed immediately after one another: the slime of the pancreas is in this way carried off.” (*Abhandlung vom Menschlichen Leben*, Budissen, 1685.) A physician of Minden, named Van der Becke, attempted an union between the chemical hypothesis and the peripatetic philosophy,—taking water, or alkali, for the *matter*, and fire, or acid, for the *form*, of all organized bodies; and was followed by one Van Rufflingh, who derived all diseases from a deficiency or a redundancy of fire or water; maintaining, for example, that, where the water predominated, the fluids became viscid, and intermittent fevers and arthritic complaints arose: these were to be cured by volatile salts, which contain many fiery particles. Condemning the em-

ployment of venesection *in toto*, this author did not scruple to adopt the same *fiery* treatment in various inflammatory distempers: so completely had false theory obscured his mind; and to such a deplorable state was medical practice reduced, in the hands of these chemical dreamers!

Some few, however, had the sagacity to perceive the inadequacy of such speculations to illustrate the phenomena of life, and ventured to call in question the propriety of applying them to the treatment of disease. Boyle, in his “*Sceptical Chemist*,” and other essays, had refuted the hypothesis of acid and alkali; and Le Mort, pursuing his ideas, attacked the doctrine of fermentation, and substituted a theory of his own, which was more immediately grounded on the corpuscular philosophy. Boiin, a professor of medicine at Leipsic, brought forward a number of arguments to prove that digestion was not effected by any fermentative process; that, in the healthy state at least, there was no acid fermentation in the stomach; and that the presence of acidity, instead of assisting, rather impaired the functions of that organ. He shewed, by experiment, that the bile did not effervesce on the addition of acids; and he controverted the doctrine of a nervous fluid, as inconsistent with the structure and properties of the nerves. Pechlin and Brunner proved, that the hypothesis of the acid nature of the pancreatic juice was utterly unfounded; that this fluid did not effervesce with the bile; and that it was not even necessary for digestion. In this manner several physiological facts became ascertained; and this is the only way in which the chemical theory can be said to have done any thing for the progress of science.

The practical errors of the chemists were ably exposed by Sydenham, who, having applied himself late, in life to the study of his profession, was never so strongly imbued with the prejudices of the schools, but that he could easily shake them off when they would not bend to his experience; and who, living on terms of intimacy with Boyle and Locke, brought into medicine many of those sound and enlightened views, which had guided their researches in other departments of learning. Adopting the suggestion of Bacon, Sydenham returned to the Hippocratic method of collecting histories of disease, and shewed the necessity of coming to its observation with an unbiassed mind; of attending more carefully to its distinguishing characters; and of marking all the circumstances by which it was liable to be modified. He saw that sufficient diligence and discrimination had not been used in these particulars; that observers either had confined their attention to uncommon cases, or, misguided by false hypothesis, had given imperfect and erroneous views of the disorders which they attempted to describe. It was only, he maintained, by discarding all hypothetical reasonings, and by investigating minutely the succession of symptoms, that we should ever be able to arrive at the knowledge of the causes, and the curative indications of disease. Accordingly, though he forgot his own precept, and indulged much in fanciful speculation, Sydenham laboured assiduously to improve the practice of medicine, and has justly acquired the title of its reformer. The descriptions which he furnished of the various epidemics of his time have served as models to succeeding writers, and in point of simplicity and accuracy have scarcely ever been surpassed; his “*Treatise on the Gout*” is still consulted as one of the best accounts of that disease. Sydenham is also to be regarded as the reviver of the antiphlogistic method; for he was the first who pointed out all the dangers of the stimulant plan which the chemists pursued in the early stages of acute disorders, and which, in many instances, but especially in small-pox, had been attended with the most fatal consequences. The practical doctrines of Sydenham, indeed, were adopted by few of his

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his contemporaries; and at the commencement of the following century a large proportion of the English physicians continued to advocate the Sylvian hypothesis, or some of its modifications.

In proportion as true chemical science advanced, the partiality for chemical explications of the functions of the living system abated; and physicians seem to have discovered, for the first time, that the theory of the humours, even with all the improvements which it derived from the corpuscular philosophy, threw no light whatever on the actions of the solids. A new hypothesis, therefore, was projected; and as men, in avoiding one error, are apt to run into the opposite extreme, physiologists now attempted to explain all the phenomena of life according to the mere mechanical powers of the organs, and to reduce the laws of the animal economy to the rigid calculations of geometry. They imagined, that they could illustrate every operation of the human body, by comparing it to a system of ropes, levers, and pulleys, united with a number of rigid tubes of different lengths and diameters, containing fluids, which, from variations in the impelling causes, moved with different degrees of velocity. When the fibres of this machine were not sufficiently flexible; when the pulleys and joints of the levers were not kept in sufficient repair; or when the apertures of the pipes were not sufficiently free; the movements were necessarily suspended, or less perfectly performed, and they were only to be brought into proper regulation, according to the practitioners who adopted this fanciful theory, by removing the above described impediments. The composition of the fluids was supposed to be the result of their motion in the tubes; and in these nothing was attended to but the forces of gravity and cohesion; as in calculating the action of a pump, or other hydraulic engine. "If the chemical school," to use the words of Sprengel, "had degraded the physician to the rank of a brewer or distiller, the disciples of the iatro-mechanical school, on the other hand, were glad to be esteemed as hydraulical engineers; and several of them, in fact, served in the double capacity of engineers and professors of medicine." One of them, Dionis, a professor of surgery at the Jardin du Roi, went so far as to compare the circulatory system to the water-works at Marly, by which the water of the Seine is raised to considerable height, and from thence made to fall again upon the great wheel.

Among the causes which conduced to the establishment of this sect, the discovery of the circulation of the blood is the most prominent. When it was found that the blood flowed in a regular manner, through certain conduits, from the heart, and returned to that organ, by other vessels, from the extremities, physicians set about calculating the mechanical force which they supposed necessary for enabling the heart and arteries to produce this effect; and, elated with their apparent success, were led by degrees to transfer their calculations to the other functions of the body. Geometry had become the prevailing study of the learned; and societies for the promotion of experimental philosophy were established in the different countries of Europe, among which the Florentine academy del Cimento took, in some measure, the lead. It was in Italy that mathematics had been most assiduously cultivated; and it was there that the first attempt was made to introduce them into medicine. In the year 1614, Sanctorius published his "*Medicina Statica*," in which he endeavoured to shew the great influence which the insensible perspiration has upon health, and to calculate with precision all the variations in its quantity, in the different conditions of the body. According to his theory, diseases originated from the noxious particles of the food being retained in the system, in consequence of the stoppage

of the transpiration; and till the latter function was restored to the proper standard, no cure could well take place. Sanctorius distinguished the different alimentary matters according to their specific gravities, and according as they appeared more or less fitted to pass off in the way of insensible perspiration; he even ventured to apply his maxims to the passions of the mind; shewing how joy and equanimity favoured the excretions, while sorrow and fear impeded them; how fevers and melancholy arose from the obstructed perspirable matter, where grief was long continued; and how they were to be removed by restoring the suspended exhalation. Among the "Aphorisms" of Sanctorius, there are many sound observations; and medical science is under considerable obligations to him for having directed the attention of physiologists to the functions of the skin, which, till then, had been in a great measure overlooked; but his views, like those of most theorists, were far too partial; and there can be little doubt that, in one respect, they had a most injurious influence, *viz.* by encouraging physicians in the universal employment of sudorifics, to which they were already too prone; and no one will now subscribe to the judgment of Boerhaave, who says of Sanctorius and his work, "*Nullus medicorum, qui ante eum scripserunt, cardinem rei ita adigit—nec ullus liber in re medica ad eam perfectionem scriptus est.*"

Such were the advances towards the formation of that system on which the talents of Borelli, Baglivi, and Bernoulli, in Italy, and of Pitcairne, Keil, Wintringham, and Mead in England, afterwards shed so much lustre. Among the French it found comparatively few supporters, though a certain Peter Chirac was captivated with Borelli's ideas to that degree, that he bequeathed 30,000 livres towards the establishment of two professorships at Montpellier; the one for comparative anatomy, and the other for the iatro-mechanical theory: but in Holland and Germany it soon made its way, and was taught at all the principal universities. That the labours of Borelli and his successors were often confirmed by observation, and have served to illustrate those movements of the living body which are clearly referrible to mechanical laws, such as the compound actions of the muscles, the functions of the eye, &c. will not be denied: but when mathematical reasonings were applied to phenomena, which furnished no fixed data for calculation, and which were, in fact, to be investigated by very different methods, no useful result could be expected. Accordingly it happened, that almost every calculator came to a different conclusion from those who had preceded him in the inquiry. Borelli, comparing the mass of the heart with that of the temporal and masseter muscles, concluded that that organ was capable of supporting a weight of 3000 pounds, and that its absolute power was therefore equal to 3000; but, as it had to overcome a resistance in the smaller arteries at least sixty times greater, its relative power must be estimated at 180,000 pounds. Keil, on the other hand, applying the Newtonian doctrine of gravitation to the motion of the blood, maintained that the power of the heart was only from five to eight ounces: but his calculations were controverted by Jurin, who made it fifteen pounds three ounces. Again, with regard to digestion, which these mechanists conceived to be only a species of trituration, Borelli instituted a comparison between the human stomach and the stomachs of different species of birds, estimating, for example, the power of that organ in the turkey-cock at 1350; Hecquet calculated the power of the coats of the human stomach and abdominal muscles at 261,000; while Astruc asserted that it amounted to only four pounds three ounces. Secretion, in like manner, was supposed to depend on the various diameter

diameter of the secreting vessels, on their different convolutions, and on the angles at which they branched off from the arteries. But in order to ensure success in the most simple of these inquiries, "it would be necessary," as D'Alembert has shewn, "to know exactly to what degree the vessels are capable of dilatation; in what manner, and according to what law, they are dilated; to be perfectly acquainted with their figure, with their various elasticity, with their different anastomoses, with the number, the strength, and the position of their valves; with the heat of the blood, and the degree of tenacity which it possesses; and with the moving powers which impel it. Even supposing each of these particulars to be accurately known, still the great number of elements, which would enter into such a theorem, would probably render all our calculations fruitless." *Elements de Philosophie*, Amst. 1764, p. 268. It is almost needless to add, that not one of these circumstances was ever properly ascertained: the laborious calculations of the mechanical physicians were therefore, for the most part, wholly nugatory.

In some respects, however, they must be allowed to have had a beneficial tendency. By accustoming the mind to the strictness of mathematical methods; by fixing the attention of physiologists on points of the animal economy that had been previously but little investigated; and by inducing them to seek occasionally for experimental proofs of their theories; they led to discoveries which probably would otherwise have long remained unmade. From the time of Harvey to the middle of the last century, in fact, anatomy continued to make great progress; the errors which had obscured its study were gradually dissipated; and the more important functions of the organic frame were explained with all the rigour of demonstration. A summary view of the principal discoveries of this epoch will shew the importance, and also, in some degree, the share which the followers of the mechanical sect had in them.

The heart had been regarded as a parenchymatous vessel by the ancients, with the exception of the author of the pseudo-Hippocratic treatise, *περὶ καρδίας*, who calls it a *strong muscle*. In the year 1663, Stenon ascertained the muscularity of its structure; and three years afterwards the work of Lower appeared, in which all the circumstances of its position and organization were more fully demonstrated. Wepfer, a physician of Suabia, instituted various experiments with cicuta and other poisons, which proved that the blood was only the exciting, and not the proximate cause, of the motion of the heart; and that this motion depended solely on the organic powers of that organ. Lange, a professor at Leipzig, gave, in the year 1680, an account of some experiments with injections, by which several important facts connected with the circulation were brought to light. He succeeded, for example, in injecting the cells of the lungs from the pulmonary artery, and the placenta from the arteries of the uterus. In 1683, a Dublin professor of the name of Molyneux demonstrated, by aid of the microscope, the circulation in the amphibia; but it was chiefly through the indefatigable exertions of Leeuwenhoek, that this new instrument of anatomical observation was brought to perfection, and that full ocular proof was afforded of the Harveian discovery. By successive improvements on his magnifiers, he was at last enabled to perceive distinctly the passage of the blood from the smallest arteries into the veins, and the continuity of these two sets of vessels; and to observe the figures of the globules of the blood. The art of injection, which was carried to a great degree of nicety by Ruyfch, served also to throw new light on the vascular system. Vieussens gave a minute de-

scription of the *vena cava*, and pointed out the *fossa ovalis* and the ring by which it is encompassed; and, in the year 1700, he discovered the serous vessels of the *ura*. Galstaldi, having divided the intercostal and eighth pair of nerves, above the heart, found that it still continued to contract; whence he justly inferred, that its action did not depend on the nervous influence. The experimental labours of Hales and Wintringham served to determine several questions relating to the motion of the blood, the connection of the veins and arteries, and their relative strength; but their calculations concerning the force of the heart and the velocity of the blood were all founded on the arbitrary principles of the mechanical system. Weibrecht and De Gorter proved the independent action of the arteries; and, lastly, Senac and Haller put an end to all controversy on the subject by their masterly descriptions of the heart, and the complete analysis of its functions.

Previously to the publication of Harvey's work on the circulation, Faber, a physician at Rome, had ascertained by experiment, that no air passed into the heart by the lungs; but very erroneous ideas concerning the functions of the latter organs continued to prevail, till Malpighi ascertained their real structure, and Mayow proved the necessity of oxygen gas for the due performance of respiration. Lower, adopting the doctrines of Mayow, was led to the conclusion, that the red colour of the blood depended on the presence of the "*nitro-aëricus* particles" of the atmosphere. Borelli, however, had the merit of giving the first complete explanation of the mechanism of respiration; shewing how the ribs and sternum are elevated by the action of the intercostal muscles, and how the cavity of the thorax is in that manner enlarged, while the lungs remained in a great measure passive; and how the air, which is inspired, is never entirely expired, though it becomes more rarefied. He rejected the hypothesis of a vital heat in the heart, and referred the exhalation from the lungs to an excretion from the bronchial glands. These opinions were adopted and extended by Pitcairn, Ström, and Lister. In the year 1715, Muschenbroek published his dissertation "*De Aëre in Humoribus*," in which he refuted several erroneous notions that had been entertained on the subject of respiration, particularly the doctrine of the admixture of the air with the blood, and of the presence of air between the pleura and the lungs. A controversy that arose between Hamberger, a disciple of the mechanical school, and Haller, had the effect of determining some disputed points relative to the action of the intercostal muscles and the state of the lungs in respiration; and the experiments, which Hales instituted with the air-pump, shewed the effects of the deprivation of air on the sensible properties of the blood.

On the 23d of July, 1622, Caspar Afelli, while dissecting a live dog, at the request of some friends, in order to demonstrate the recurrent nerves, observed a number of small white threads crossing the mesentery. At first he conceived they were nerves; but happening to cut into one of them, he remarked a small portion of a milky fluid flowing from the opening. Full of joy at this unexpected discovery, he cried out to the bystanders *εὐρηκα*, and resolved to lose no time in repeating the experiment. Finding, accordingly, that these vessels were observable in living animals, only after a full meal, he concluded that they were the true *vasa chylosa*; which was further proved by their origin in the villous coat of the intestines, and by the valves with which they were furnished: but he erroneously supposed them to unite in the pancreas, and from that to pass into the liver. The observation of Afelli was soon afterwards confirmed in the human body by Peiresc, Vesling, and

others; but the same false notions of their termination continued to prevail, till Pecquet, in the year 1647, struck with the appearance of a milky fluid in the vena cava of a dog, was led to the discovery of the thoracic duct. This great discovery, like that of the circulation of the blood, was disputed with much warmth; and it is a blot in the character of Harvey, that he sided with the opponents of Aselli, and would not even be convinced by the demonstrations of Pecquet and Vesling. How different the conduct of his own adversary, Plempius, who, after having long contended against the circulation, made a voluntary acknowledgment of his error, and freely embraced the new doctrine; and who, upon the present occasion, displayed the same amiable candour. In 1651, Olaus Rudbeck discovered the absorbent vessels of the large intestines, and remarked, that the supposed lacteal vessels of the liver served only to convey a lymphatic fluid to the hepatic glands; whence he conjectured, that the received opinion concerning the assimilating powers of that organ was altogether wrong. Shortly afterwards, Glisson and Wharton produced their respective works on the Liver and on the Glands, in which their structure and functions were more fully described. The latter gave the first account of the ducts of the parotids. Experiments were undertaken by Lower, Drelin-court, Lister, and Musgrave, to determine the motion of the chyle, and the changes to which it is subjected in its course; and before the close of the century the anatomy of the absorbent system was brought to a great degree of perfection by the labours of Nuck, Pachioni, and Duverney.

The discoveries relating to the nervous system, and the organs of sense, were not less remarkable. Cafferius, Sylvius, and Willis, applying themselves to the dissection of the brain, gave accurate views of its different parts, and of their relative position, and shewed the difference between the human brain and nerves, and those of other animals. Willis gave to the hypothesis of a nervous fluid a degree of consequence, which it had never before attained, supposing it to be the vehicle of the animal spirits, and the cause of various disorders, when it became vitiated; and he may be regarded as the precursor of Dr. Gall, in referring particular faculties of the mind to certain parts of the brain. His ideas on the former of these subjects were controverted by Malpighi, who investigating, with great industry, the nature of the cortical substance, shewed, that it extended to the innermost parts of the brain, and in some animals even to the *medulla oblongata*; that its structure was fibrous; and that the fibres of which it consisted united in the great commissure and medulla oblongata, and again diverged into the brain; whence he infers, that the brain is to be considered as the appendage of the spinal marrow. The *tunica arachnoides* was described by Blaes and Swammerdam; and Leeuwenhoek and Ruyfch ascertained, by the microscope, and by injections, the vascularity of the substance of the brain. The theory of vision had received considerable improvement from the labours of Kepler, who had pointed out the true use of the crystalline lens, and shewn how the images of external objects were formed, in an inverted position, on the retina. A public experiment with the eye of an ox, which was made at Rome, in 1625, by the Jesuit Scheiner, fully confirmed Kepler's theory; but afterwards Mariotte, having found that the images of objects disappeared when they fell on the spot where the optic nerve enters the eye, called in question the sensibility of the retina, and maintained that the choroid coat was better calculated to receive and transmit the perceptions of sight; and a controversy arose concerning the actual seat of vision, which was carried on, with great eagerness, by

Pecquet, Perrault, and St. Yves, and which had the effect of eliciting many valuable observations. The Newtonian discoveries, respecting the properties of light, contributed still more to the accurate analysis of the functions of the eye; and the treatises of Du Petit, Porterfield, and Zinn, which followed soon after, have left little for their successors to accomplish.

Passing over the improved descriptions which Cafferius, Duverney, Riverius, Vicussens, and others, gave of the structure of the ear; the interesting experiments of Harvey, Malpighi, and Redi, on the generation of animals; the discovery of the seminal animalculæ by Leeuwenhoek; and the various discussions and theories to which they severally gave rise; we conceive that we have adduced sufficient proofs of the great increase which took place in anatomical knowledge, and of the indirect advantages which medical science derived from the application of mathematics, and from the improved methods of physical research, which came into use after the time of Bacon. Wherever the laws of mechanics were properly applied, as they were by Borelli to muscular motion, and by Kepler and his followers to the theory of vision, they explained and illustrated the phenomena of life; and even when they were transferred to questions, which they were altogether incompetent to determine, as in the calculations of Borelli, Keil, Hales, and Winingraham, respecting the action of the heart and arteries; they suggested and led the way to many luminous experiments. In these respects the mechanists had greatly the advantage over their chemical brethren, whose speculations being founded on vague and puerile hypothesis, and implying no acquaintance with the laws of nature, led only to an accumulation of errors.

Descartes had taught his followers to consider matter as purely passive, and to refer all the changes to which it is subjected to a spiritual cause: the union of body and spirit was, in his estimation, merely one of its modes, or accidental conditions. Malebranche, extending the Cartesian doctrine, endeavoured to explain more fully the nature of this union, and to shew that the soul had a more or less distinct consciousness of all the movements and affections of the body. The part which the animal spirits were made to perform has been already frequently noticed. From these tenets, the transition to the system which came to be afterwards developed by Stahl was very easy; and an attentive review of the progress of the opinions in question must convince every one that the Stahlian hypothesis, far from being entitled to the merit of originality which its author claimed, was nothing more than an offspring of the Cartesian philosophy. Educated under Wedel, who was a devoted adherent of Sylvius, and an assiduous teacher of his doctrines, Stahl began very early to question the sufficiency of those chemical explanations, which he heard applied to all the phenomena of life. It appeared very wonderful to him, that the humours of the body, which are, of themselves, so disposed to putrefaction, should yet so seldom fall into that state; and that the daily presence of so many saline substances, as we are in the habit of receiving in our food, should produce so few symptoms of acrimony. He also remarked the great influence which the passions of the mind had in the production of diseases, and their instantaneous operation, in general, on the corporeal frame. The intervention of animal spirits he conceived to be a very unsatisfactory supposition; and all the attempts which had been made to explain the theory of life on pure chemical and mechanical principles he held very cheap. Taking the passiveness of matter for the basis of his system, he maintained, "that the body, as body, had no power to move itself, but was put in

motion only by immaterial substances; that all motion, therefore, was immaterial, and a spiritual act." The origin of all the actions of the living system, by which it is enabled to preserve itself, and to fulfil the ends for which it is created, must, according to Stahl, be sought for in the *soul*, or immaterial principle which animates it,—the nature, or $\psi\upsilon\chi\eta$ of the ancients. A little observation will teach us, that many sensations are experienced, and many corporeal actions performed, which are either altogether unnoticed at the time, or of which we have only an obscure consciousness; but in which it cannot be doubted, that the mind more or less participates. Finding this to be the case with respect to our perceptions, and the anatomical movements, as they have been termed, of the body, Stahl thought himself justified in supposing the same power to preside over all the other functions, and accordingly referred the performance of digestion, absorption, and assimilation, to the immediate agency of the soul. As the soul regulates thus incessantly the ordinary movements of the animal machine, and is thus constantly intent on its preservation, the same salutary vigilance may be naturally expected during disease. In fact, disease may be generally said to consist in a deranged idea (*perturbata idea*) of the regulation of the animal economy; and this position Stahl conceives to be proved by the greater frequency of diseases in the human species, than among the inferior animals, and from their attacking, most readily, those persons who are endowed with a high degree of sensibility. Several secondary causes, however, appeared necessary to the further illustration of this peculiar pathology, among which plethora had the most extensive agency assigned to it. To this condition, Stahl believes that there is a constant tendency in the human body, and that it proceeds from the quantity of aliment received being always greater than is necessary for the support of the organs: it shews itself in different parts of the frame, at different periods of life; in infancy, for example, in the head; afterwards in the lungs; and finally in the digestive organs. Hemorrhages were, for the most part, occasioned by an effort of nature to moderate this disposition to plethora, by what Stahl called the *tonic vital action*; as exemplified in menstruation, and in the hemorrhoidal discharges which occur in advanced age, and which Stahl ascribed to the tonic action of the *vena portæ*, the source of the great majority of chronic distempers, "*porta malorum*." Rejecting, as altogether unfounded, the doctrine of the acidity and alealescence of the humours, Stahl inculcated the necessity of studying, in disease, the organic movements of the system, and of observing the processes by which nature effects a cure. Fever, according to his view, was merely an autocratic effort of nature, to conquer the morbid cause, and to expel it from the body, and all the symptoms, not excepting *rigor*, were only so many proofs of the tonic action which was thus excited. Congestions were supposed, in contradistinction to obstructions, to result from an afflux of the fluids occasioned by the same tonic power; when obstruction followed, or when the object of the congestion, *i. e.* evacuation, was not accomplished, inflammation took place; and the tendency of the violent actions, which accompanied it, was to disperse the obstructed humour. If this end was not attained, the obstructed matter became vitiated, and pus was formed. Hypochondriasis, gout, melancholy, and almost all cachectic disorders, were attributed to a diminution of the tonic power of the *vena portæ*, and the consequent stoppage of the blood in it; while spasmodic diseases were thought to indicate an excess of the general tonic power of the system.

In the treatment of diseases Stahl proceeded in conformity

to these views. The chief duty of a physician, he maintained, was to watch the healing efforts of nature; to leave the cure to them, when they seemed adequate to its accomplishment; but to assist them when they were too feeble, and to moderate their violence when they were too powerful. Thus, holding evacuation to be indicated in fevers, he recommended the assiduous employment of such means as were likely to promote it, particularly diaphoretics. Purgation, indeed, he conceived to be seldom necessary or useful; but venesection he had little hesitation in administering, as it served, in his opinion, to bring about the crisis, and to favour the efforts of nature to relieve herself from the superfluity of blood; it might, however, prove injurious, if due attention was not afterwards paid to the excitement of sweating. The Peruvian bark was admitted by Stahl to operate in the cure of intermittents by its alluring qualities; but he believed it rather suppressed the disease, than effected its complete removal. Generally speaking, his favourite remedies were evacuants, such as antimony, aloës, rhubarb, and jalap; to the use of chalybeate medicines in chronic complaints, he objected, that they caused too powerful contractions of the parts; and opium tended, as he thought, to counteract too much the tonic vital action; yet he prescribed hyosciamus, without any scruple.

"The ideas of Stahl," observes M. Cabanis, "have, in general, been very imperfectly understood; we may even assert, that they have been almost equally disfigured by his censurers and by his admirers. The causes of this misunderstanding deserve to be detailed in a particular work. It would be useful to exhibit the Stahlian system, in more determinate points of view, than the author himself could possibly have done. Hitherto the points, by which it is distinguished from the doctrines of the ancients, and those by which it is related to them, have never been precisely ascertained. Perhaps, too, it would be advisable to conclude a work of this description by a systematic view of the progress of medical science since the time of Stahl, and of the advances which we have reason to expect at no very distant period. It would probably result from this investigation, that the reforms, which have been already effected, and those which may be hereafter accomplished in the same spirit, must be ascribed, in a great measure, to this extraordinary man; both on account of the sound ideas which he directly established, and of the impulse which he communicated to public opinion. It would too, I am persuaded, appear, that notwithstanding the haughty manner in which the adversaries of Stahl have attacked him; notwithstanding the awkwardness with which some of his disciples have defended, explained, and commented upon his works; still his influence has not been less powerful in medicine than in chemistry, and that to both sciences he has rendered everlasting services." *Coup d'Œil*, p. 148—9.

Of Stahl's merit as a chemist we shall have occasion to speak at large in a future volume; in this place we shall be content with observing, that, although he effected a complete revolution in chemical science, and continued to lecture upon it, with great applause, during the whole period of his academical career; yet he had the good sense to refrain from all application of chemistry to medicine, and repeatedly cautioned his disciples of the futility of any such attempt; contending, that the true theory of physic consists in the study of the vital actions, and has little or nothing to do with the laws of mechanics, with the minute anatomy of the solids, or with the mixture of the fluids; that its chief object is to ascertain by experience the laws of organic life; that it is therefore little else than rational empiricism;

and in the neglect of this empirical method is to be found the origin of all the controversies of physicians. Notwithstanding these salutary admonitions, it is evident that Stahl himself forsook this empirical method, when he gave "to an airy nothing a local habitation and a name," by personifying the principle of life, and ascribing to the direct agency of a rational intelligence all the corporeal functions of the system. Some persons, it is true, have imagined that they could perceive, through the obscurity of Stahl's style, the glimpses of a more enlightened physiology, and Cabanis even contends that Stahl selected the term *anima* or *soul*, merely in order to save himself from persecution; not as thinking it by any means the best calculated to express his views: but this would have been a species of deception, to which it is not probable that the haughty spirit of Stahl would have stooped; and nothing appears in his writings to warrant the belief, that he wished the phrase in question to be understood in any but the literal and vulgar acceptance.

Stahl's contemporary and colleague, Frederic Hoffmann, though endowed with less genius, was his superior in learning, and in the faculty of displaying it to advantage; and he accordingly obtained, as a teacher, a much higher degree of repute. But while he professed himself the enemy of hypothesis, and the follower of Hippocrates, he gave in to many of the prevailing errors, and supported many doctrines which had no foundation in truth. Mathematical studies had taught him to reason closely; and, if the premises be admitted on which he constructed his system, the consequences must be allowed to be, for the most part, correctly deduced: but in his illustrations he is extremely diffuse and fatiguing; and his repetitions are endless. At first a follower of the mechanical sect, he seems to have gradually approached to the opinions of Stahl, and that at the very time when he was engaged in controverting them, and was exclaiming against their supposed atheistical tendency. His theory, accordingly, is a heterogeneous mixture of speculations, few of which would be now deserving of notice, were it not for the celebrity of their author, and the tone which he gave to succeeding theorists. Vindicating the active qualities of matter, Hoffmann considered the human body as a machine, which is governed by the laws of mechanics, and put in motion by a nervous fluid, or ether, contained in the brain and nerves, and the blood. The heart and all the organs of the system were supposed by him to receive their strength, their tone, their contractile and elastic power, from this subtle fluid: he even ascribed to it a certain degree of intelligence, "*vim sensitivam et imaginativam*," by which each particle is enabled to form a correct idea of the mechanism of the body, and to regulate its agency accordingly! Medicine, he believed, was to be improved, not so much by experience, as by the skilful application of mechanical principles, and by the sedulous study of proximate causes. All disease he held to consist in irregularity of action: when too violent, spasms were produced; when too weak, atony was the consequence. Yet he agreed with Stahl in referring much to obstructions of the humours, particularly in the *vena porta*; but maintained that they always implied relaxation, or atony, of the vessels. He even admitted the doctrine of corruption of the fluids; ascribing gout, rheumatism, calculi, and cutaneous diseases, to acids generated in the body, and converted into neutral salts, upon admixture with the blood. Plethora was also allowed by him to be one of the chief causes of disease. The *spasm*, or constriction of the membranous and minute vessels, particularly of the skin, by which the blood is repelled to the interior parts, and the heart and larger arteries are incited to greater action, till

they are enabled to overcome the resisting cause, was, according to Hoffmann, the origin of every description of fever; and inflammation was explained by him on similar principles.

As a practitioner, Hoffmann appears to have been more successful than his rival, and to have had, indeed, a just title to that fame which he enjoyed. Though he inculcated the strict observation of critical days, yet he had the courage to maintain, in opposition to the universally received opinion, that it was not always necessary to wait for the concoction of the morbid matter in fever; for he believed the disorder might be sometimes stopped, in the commencement, by the administration of powerful means. Venesection was employed by him in all violent affections of the vascular system; and he trusted much to the antiphlogistic regimen in sthenic disorders. Among sudorifics he chose only the mildest; and drastic medicines were in little repute with him. The use of Peruvian bark in intermittents was rescued by Hoffmann from the contempt with which the Stahlians affected to view it; he demonstrated the great efficacy of chalybeates in various chronic complaints, and fully refuted the notion that they produced too great a constriction of the fibres. He investigated the nature of several of the most famous mineral waters; shewed their safety and utility in disorders for which they had been thought unfit; and taught to imitate them artificially. Warm and cold bathing were much commended by him for their virtues in restoring the proper tone of the system; and wine, camphor, and the well-known *liquor anodynus*, were favourite remedies with him in most chronic diseases: the last mentioned was generally used by him in the place of opium.

While Hoffmann was thus usefully employed in diffusing more sound practical doctrines among his contemporaries, Boerhaave was labouring, with equal zeal, and even with greater success, in the same path. Like Hoffmann, he began by commending the Hippocratic method; and, like him too, he soon deviated from it, by yielding to the influence of his early studies, and by acquiescing too much in the spirit of his age. He had enjoyed but little opportunity of acquiring a practical acquaintance with anatomy; and this want, as has been justly remarked, is perceivable throughout his writings. Fancying that the best system of physic would be that which reconciled all opinions, he sought to combine the doctrines of Hippocrates with those of Sylvius and Bellini, and was therefore, in the strictest sense of the word, an *Eclectic*, and not the founder of a new theory, as he has been sometimes considered. He refuted, it is true, many of the errors of the chemical school, and, in particular, the idea of a fermentation in the stomach and blood; but he embraced, in its fullest extent, the notion of an acid and an alkaline *cacoehymia*: the tenets of the mechanists were adopted by him with less reservation. In general, however, less extravagant than his predecessors, he enlarged the boundaries of medical science by his observations; while, by the charms of his style and delivery, he gave a lustre and attraction to his doctrines, which procured him disciples from all parts of the world.

To this triumvirate, as they have been called, to Boerhaave, Stahl, and Hoffmann, pathology and therapeutics owe many of their greatest improvements. All succeeding systematics have borrowed more or less from their speculations; and, in certain universities, their theories, or at least modifications of them, are still taught. However fanciful the views of Stahl may at first sight appear, it cannot be doubted that they had the effect of fixing the attention of physicians on a most important branch of the animal economy, the influence

fluence of the nervous system upon the other organs of the body, and its co-operation in the production and cure of diseases. However much we may be tempted to laugh at Hoffmann's æthereal fluid, and the sagacity and prudence which he ascribed to it, a careful examination of his writings will probably teach us, that by this very hypothesis he was led to the discovery of the relations which he pointed out between the different functions of the living frame, and of the sympathies which are the consequence. Considering how little this part of pathology had been investigated, and by what erroneous notions the study of it was obscured, we must allow, that Hoffmann and Stahl had no small merit in opening the way to its illustration, though they afterwards may have cast, upon the object of their researches, the false colouring of their respective theories. Hoffmann, in particular, has collected many valuable observations, in his treatise "De consensu partium nervosarum," proving the reciprocal influence which the various organs exert upon one another, especially those which are connected by means of the sympathetic nerve.

Among the adherents of Stahl, Porterfield, Whytt, Bordeu, and Sauvages, are the most eminent. The last-mentioned is well-known as the author of the first methodical Nosology, a work of great labour and research, which, notwithstanding the imperfections of its arrangement, contains much practical information, and which has served as the model of all similar subsequent undertakings. Bordeu had the merit of pointing out the importance of the cellular membrane, and of determining many of its properties which had been overlooked; while Porterfield and Whytt endeavoured to trace the laws that govern the muscular actions of the body, and to shew their dependence on the nervous influence.

The majority of the physicians of the age, having studied under Boerhaave, or his immediate disciples, followed the system of the Dutch professor. But the new light which was thrown on physiological science by the experiments and the splendid discoveries of Haller, tended to wean them from opinions which were but little consonant to experience, and the fallacy of which they were now in many instances compelled to acknowledge. Boerhaave, in his posthumous work "De Morbis Nervorum," had espoused the ancient dogma of an *æther*, or *impetum faciens*, which he figured to himself as an intermediate substance between matter and spirit, and to which he attributed all the sensations and motions of the animal frame. His nephew, Kaau-Boerhaave, developed more fully his ideas on this subject; and De Gorter and Gaubius, taking up the same views, and giving them somewhat greater precision, obtained for the hypothesis of a *vital principle* that distinction which, unfortunately for the interests of science, it has, till within these very few years, been allowed to claim in physiological disquisitions.

Such was the state of things, when Cullen ascended the professorial chair. Led, by the duties of his office, to review and examine the various systems of physic which were in vogue, he soon perceived the inconsistencies of the Boerhaavian theory, and accordingly resolved to abandon it. Stahl's doctrines, to which some of his contemporaries adhered, did not appear to him more satisfactory; and, in particular, he deemed them objectionable on account of the inert practice which they countenanced. Nor could he altogether assent to the system of Hoffmann, though he conceived it to approach nearer to the truth, and was induced to adopt some of its fundamental principles. Among others, he took up the doctrines of spasm and debility, from which he deduced all the phenomena of febrile disorders; and he

endeavoured to confirm his theory by proofs drawn from the laws of the nervous system, and from the consideration of the remote causes of the diseases in question. Rheumatism was referred by him to a spasm of the muscular fibres, arising from an increased afflux of blood; but gout he conceived to originate in atony, especially in atony of the digestive organs. In these latter diseases, he rejected the idea of a peculiar morbid matter; yet in his explanations of certain other complaints, as, for instance, of serofula, he had recourse to the supposition of an acrimony of the fluids. He laid much stress on the efforts of the *vis medicatrix nature*, advocated the hypothesis of a nervous fluid and vital principle, and ascribed to the brain a peculiar faculty, by which it was enabled to excite the muscles to action, independently of the mind, and to which he gave the name of *irrevocability of the sensorium*. As we have had frequent occasion to review the opinions of Cullen, in various parts of this work, especially under the article FEVER, we may be excused from entering more fully into detail in this place; particularly as there is so little essential difference between them and those of his predecessor Hoffmann, and as the great majority of them have been exploded by the more recent improvements in physiology. Cullen, indeed, seems to have been much in the same situation with Boerhaave, as to anatomical and physiological learning, of which many of his speculations betray a miserable deficiency. Yet his system continues to be taught, and, in some measure, to form the present creed of the Edinburgh school; a distinction which it would scarcely have maintained, had it not been for the transcendent merits of the author as a practitioner, and for the rational and consistent method of treating diseases which he inculcated.

In another point of view, however, the speculative doctrines of Cullen seem to deserve notice, *viz.* as having afforded the first hint of the Brunonian theory of *excitability*. In a passage of his "Institutions of Physiology," Cullen speaks of a state of *excitement*, or *collapse*, of the brain and nervous system, on which he supposes the strength or debility of the other parts of the body to depend; and in his other writings, he is constantly labouring to prove in what manner these conditions may be occasioned by the agency of various causes. Brown, seizing upon this idea, set about the formation of a new theory, according to which all the actions of life were to be referred to the *excitement* of the body by *stimuli*, and all diseases reduced to the two general heads of *direct* and *indirect* debility, or debility arising from a deficiency, or a previous excess of excitement. That the doctrine of morbid excitement is so far founded on truth, and that many of the leading symptoms of disease may be referred to it, we are not inclined to dispute; but when Brown proceeds to account for all the deviations from health upon this simple principle, we conceive that he has generalised too much, and evinced but small power of discrimination. The excitability and the excitement of the living body doubtless vary much at different times, and disease is often the consequence; but it is not true, as Brown contends, that when the excitement of any part has been unusually increased or diminished, a correspondent increase or diminution of excitement must take place in all the rest of the system: on the contrary, it will be found, that when one part or series of organs has been incited to greater action than common, the other parts generally exhibit a decrease of action; and *vice versa*. The Brunonian theory, in truth, takes but a gross view of the laws of organic life; and, with respect to the classification of diseases, it cannot be considered as much more refined and satisfactory than the

theory

theory of the *stridium* and *laxum*, as taught by Themison and his followers. To the practical maxims which its author laboured to establish, the same observation applies. Brown mistook a single property of animal matter for the primary cause of life and disease; neglecting the consideration of those various powers which the different organs possess, according to their peculiarities of structure, and overlooking entirely those laws by which they influence each other, and communicate or modify the affections to which they are severally liable. This has been the grand defect of almost all pathological systems; and it was not to be expected that Brown, whose practical knowledge was confined, and whose acquirements in general were superficial, should have outstripped his predecessors. Many of those who were most zealous in their devotion to his system, and who defended it most strenuously on its first promulgation, have found it so incompetent a guide at the bed-side of the patient, that they have deemed it advisable to qualify their belief in several essential articles; while others, as Frank and Reid, have been reduced to the necessity of completely recanting their faith. But we are, nevertheless, disposed to think, that the general spread of Brunonianism, especially on the continent, has had the beneficial effect of loosening the attachment of physicians to ancient prejudices, and of simplifying their complex, and too often incongruous, modes of practice. See EXCITABILITY.

Previous to Darwin, no one seems to have conceived the idea of applying the doctrine of *association* to the theory and the treatment of disease; although the tenets of Hartley were embraced by a large proportion of his countrymen, and his illustrations of the associative actions of the nervous and muscular systems were universally received. It is true that Hoffmann, and even some writers before his time, had remarked the sympathy, or *consensus*, which subsists between particular organs of the body; but their observations were blended with much erroneous hypothesis, and the rude state of physiological science, at the time, prevented them from discovering the extensive application of which they were susceptible. Darwin saw that the chief errors of preceding theorists had arisen from the partial views which they had taken of the animal economy; from their considering the living system as a simple whole, and not paying due regard to the reciprocal influence which the different organs, of which it was composed, have upon one another: he saw, too, that it was only by the same organic powers, by which the body is preserved and developed, that disease was generated, and formed, and finally removed from the system. Taking advantage of all the facts which had been accumulated by his predecessors, placing them sometimes in new lights, and at other times confirming and illustrating them by his own observations and experiments, he proceeded to the construction of a system of pathology and therapeutics, founded on the general laws of animated nature. Unfortunately, however, as he advanced in his design, he fell into many incongruities; and the difficulties increasing upon him, he was led to assume positions, which were not supported by any evidence, or countenanced by the slightest analogy. Such are his doctrine of the configurations of the organs of sense, many of his remarks on the exertions of the sensorial power, and the hypothesis of a retrograde action of the absorbents. Add to this, that the language which he employed is vague and inconsistent, and has occasioned much confusion and contradiction in his statements. Nor can we highly commend his division of diseases into those of irritation, sensation, volition, and association; the distinctions being frequently arbitrary and inconclusive, and the whole arrangement fa-

vouring of metaphysical subtlety. The best part of his works, and that in which he has evinced the most penetration, is unquestionably his account of the "Catenation of Animal Motions," and of the "Diseases of Association," particularly his "Theory of Fever." Rejecting, as illusive, all the explications which had been given of febrile disorders, on chemical and mechanical principles, Darwin has traced the succession of the symptoms of fever to the irregular actions of the nervous, vascular, and absorbent systems; shewing how the derangement of one part produces a similar or opposite affection of other parts, in consequence of the intimate connection of the organs in question, and the influence which they mutually possess. (See FEVER.) This was a great improvement in pathology, and it is only to be regretted that it should have been disfigured by the imperfections to which we have before adverted. Had Darwin possessed the profound anatomical knowledge, and the acute discernment of Bichat, he would have probably erected a system as finished in its parts, and capable of as extensive application, as the theory of gravitation; and as superior to the feeble creations of his predecessors, as the philosophy of Newton is to that of Descartes. But in his eagerness to explain every thing, he sometimes mistook words for facts; and his ardent imagination too often got the better of his judgment. It cannot, however, be doubted, that he had struck into the right path, and pursued it to a certain extent; and that his views have served to elucidate the nature of many disorders, which before had been greatly misunderstood. His writings contain a rich store of physiological observations, and many useful practical hints. If his theoretical doctrines have been regarded with distrust by his countrymen, they have experienced a more favourable reception on the continent: they have been partially adopted and improved upon by some enlightened physicians, particularly by Brandis and Hufeland; and when stripped of the hypothetical phraseology in which they are enveloped, they bid fair to become the foundation of a rational system of physic.

To complete the history of medical science, of which we have now pointed out the principal revolutions, it would be necessary to enumerate and investigate the merits of the different discoveries and improvements which have taken place, in all its different branches, during the present age. But not to speak of the delicacy of such an undertaking, and the abilities requisite for its correct and impartial performance, it is obvious that this would be, in a great measure, to describe the existing condition of the art, of which the plan of our work already comprehends the details. We shall, therefore, content ourselves in this place with remarking, that however much the continental nations may have extended the boundaries of the auxiliary sciences, and however great their claims in other respects may be, this country has taken a decided lead in the reform of medical practice. It may boast of setting the example to Europe in the employment of the cold affusion, and in the generally improved treatment of fever, in the revival and extension of the purgative method of cure, in the free use of mercury in cachectic disorders, and, above all, in the introduction of the vaccine inoculation. But we must acknowledge, that much still remains for us to accomplish; that the theory of medicine is yet in an unsettled state; that its practical application is too often wavering and fallacious; and taking a survey of the various fortunes of the art, we may say, with Bacon, that "*medicine is a science, which hath been more professed than laboured, and yet more laboured than advanced; the labour having been rather in circle, than in progression.*"

We subjoin a list of the best works on medical history, with their respective characters.

1. Histoire de la Médecine, où l'on voit l'Origine et les Progrès de cet Art—avec fig. par Daniel le Clerc, 12mo. Genev. 1696—4to. 3d Part, Amsterdam, 1723.

A work of considerable merit for the time when it first appeared. It gives a very full view of the doctrines of the ancients to the time of Galen, and, generally speaking, is written with great impartiality; though, on some occasions, the author shews a want of discernment. "Nemo candidus et plenius scripsit Clerico," was the favourable judgment of Haller.

2. The History of Physic, from the Time of Galen to the Beginning of the Sixteenth Century. By J. Friend. 2 Parts. London 1725—26.

This is a useful commentary on the history of Le Clerc, and gives, besides, a minute account of the practice of the Arabian and middle ages; but the arrangement is defective.

3. J. H. Schulzii Historia Medicinæ, a rerum initio ad A. U. C. 535 deducta, 4to. Lips. 1728. Ej. Compendium Historiæ Medicæ, a rerum initio ad Hadriani excessum, 8vo. Halæ, 1742.

As far as this history extends, it deserves unqualified commendation for the learning, the accuracy, and the discrimination which it displays. The account of the state of medicine in ancient Egypt is the best which we possess; and the whole is compiled with such care, that, as Ackermann observes, it would be difficult to detect a single error in it.

4. Dictionnaire Historique de la Médecine ancienne et moderne. Par N. F. J. Eloy, 2de Ed. 4 tomes 4to. Mons. 1778.

A valuable book of reference, particularly for the lives and writings of the French physicians.

5. Biographical Memoirs of Medicine in Great Britain, from the Revival of Letters to the Time of Harvey. By John Aikin, 8vo. Lond. 1780.

It was the design of the author to furnish a complete medical biography of Great Britain; but not meeting with sufficient encouragement, although this part of his labours is highly creditable, he has never accomplished his scheme.

6. Institutiones Historiæ Medicinæ. Auctore J. C. G. Ackermann, 8vo. Noriberg. 1792.

All Ackermann's writings bear the marks of great erudition and intelligence: his contributions to the new edition of Fabricius's "Bibliotheca Græca," have, in particular, thrown much light on the lives and writings of the Greek physicians. It is to be regretted, that his elegant compendium of medical history does not extend beyond the period of the Arabians.

7. Versuch einer pragmatischen Geschichte der Arzneykunde, von Kurt Sprengel. 2te Aufl. 5 Th. Halle, 1800—1803.

This is by far the completest history of medicine which we have; but, though the labour of fourteen years, the execution of it is very unequal. Where Sprengel could avail himself of the labours of others, he has given a very satisfactory view of the advances of the art; and his researches concerning its condition among the Arabians claim the merit of fulness, and also, in some measure, of originality: but there is a great falling off in the latter parts of the work; and the concluding volume proves that the author has no pretensions to any thing like a philosophic mind. His "View of the State of Physic during the last ten Years of the Eighteenth Century," published in 1801, is a hasty and extremely feeble performance, to call it by no severer name. A French

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translation by Geiger, of the first volume of the history, appeared in 1809; but according to the account given of it by Millin, it is very carefully executed.

8. Coup d'Œil sur les Révolutions et sur la Réforme de la Médecine. Par P. J. G. Cabanis, 8vo. Paris 1804.

A work well worthy of perusal, on account of the philosophical spirit in which it is composed, and the useful views which it suggests concerning the reform of the art. The historical part, however, is superficial, and badly arranged. A translation, with some notes by Dr. Henderson, was published in 1826.

9. J. F. Blumenbachii Introductio in Historiam Medicinæ Litterariam, 8vo. Götting. 1786.

10. Versuch einer Chronologischen Uebersicht der Litterärsgeschichte der Arzneiwissenschaft, verfasst von D. J. G. Knebel, 8vo. Breslaw, 1799.

These are two convenient manuals of the literary history of medicine. The former especially is distinguished by its neatness and accuracy.

The "Bibliotheca" of Haller are too well known to require commendation in this place.

Among the minor and less important works the following may be mentioned.

J. C. Barclufen Historia Medicinæ, in qua pleraque Medicorum Ratiocinia, ab Exordio Medicinæ usque ad nostra Tempora pertractantur, 4to. Traj. ad Rhen. 1723. H. Conringii Introductio in universam Artem Medicam, 4to. Hal. 1726. J. C. Lettsom, History of the Origin of Medicine, an Oration, 4to. Lond. 1778. Walker's Memoirs of Medicine, Lond. 1799. R. Scuderi, Introduzione alla Storia della Medicina antica e moderna, 8vo. Venezia, 1800. Millar's Disquisitions in the History of Medicine, 8vo. Glasgow, 1811.

MEDICINE, *Clinical*, *Medicina clinica*. See CLINIC

MEDICINE, *Characters in*. See CHARACTERS.

MEDICINE, *Pandects in*. See PANDECT.

MEDICINE-Chest, is a portable chest, containing all sorts of medicines necessary for a campaign or voyage, together with such instruments as are most necessary and useful for the purposes of surgery.

MEDIEDNIK, in *Geography*, a mountain of Bosnia; 10 miles N. of Zwornik.

MEDIES, or MEGIES, a town of Transilvania; 20 miles N. of Hermanstadt. N. lat. 46° 20'. E. long. 23° 58'.—Also, a town of Hungary; 10 miles N. of Zatmar.

MEDIETAS LINGUÆ, in *Law*, an inquest impanelled, whereof the one half consists of natives or denizens, the other of aliens.

It is used in pleas, wherein the one party is a stranger, and the other a denizen. Solomon de Stanford a Jew, in the time of Edward I. had a cause tried before the sheriff of Norwich, by a jury of *sex probos & legales homines, & sex legales Judæos de civitate Norwici*. See JURY.

This manner of trial was first given by the stat. 28 Ed. III. c. 13; before which it was obtained by the king's grant. He that will have the advantage of trial "per medietatem linguæ," must pray it; for it is said he cannot have the benefit of it by way of challenge. (Staufd. P. C. 158. 3 Inst. 117.) In petit treason, murder, and felony, "medietas linguæ" is allowed; but for high treason, an alien shall be tried by the common law, and not "per medietatem linguæ." (H. P. C. 261.) And a grand jury ought not to be "de medietate linguæ" in any case. (Wood's Inst. 263.) A jury "de medietate" is also allowed in some other cases, by analogy to this rule "de medietate linguæ." As on a "Jus Patronatus," the jury must consist of six clergymen and six laymen.

So also under stat. 8 Henry VI. c. 12. against embezzling records, the jury shall consist of six persons, who are officers of any of the superior courts, and six common jurors. So on a criminal trial in the university courts, the jury must be half freeholders of the county, and half matriculated laymen of the university. See *University COURT*. Bl. Com. book iv.

MEDIMNUM, *Μεδιμνον*, among the Greeks, a measure of capacity holding six Roman *modii* or bushels.

MEDIN, in *Commerce*, called also Para, Fadda, Kata, and Mesria, a coin of Syria, of the size of an English silver threepence, worth a little above a halfpenny.

MEDINA, PETER DE, in *Biography*, a Spanish mathematician, who flourished in the sixteenth century, but of whose personal history we only know that he was a native of Seville, and the friend of the learned John Vassæus during his residence in that city, who, in his "*Chronicon Hispaniæ*," speaks in the highest terms of his skill in the mathematical sciences, and particularly as they were applicable to the art of navigation. His works are, 1. "*Arte de Naviar*," which met with a very favourable reception, and which was translated into the German, French, and Italian languages. 2. "*Libro de las Grandezas y cosas memorables de Espanna*:" this work, which is descriptive of the objects that are chiefly deserving of attention in Spain, Florian Docampo has transcribed into his "*History of Spain*." 3. "*A Map of Spain*," and many other pieces.

MEDINA, in *Geography*, a city of Arabia Felix, in the province of Hedsjas, about a day's journey from Jambo, on the Red sea. It is situated in a sandy plain, of moderate extent, and surrounded with indifferent walls. It belongs to the sherriffe of Mecca, but of late has been governed by a sovereign of its own, of the family of Darii Berkad. At present the sherriffe rules it by a vizir, who must be of the royal family. Before the days of Mahomet, it was called Jathreb; but it was called Medined en Nebbi, the city of the prophet, from the period at which Mahomet, upon his expulsion from Mecca by the Koreishites, took refuge here, and continued to make it the place of his residence for the rest of his life. The tomb of Mahomet at Medina is held in respect by the Mussulmans; but they are not obliged to visit it in order to the performance of any devotional exercises; however, as the caravans from Syria necessarily pass near it in their return from Mecca, they turn aside to view the prophet's tomb. This tomb is situated in a corner of the great square; whereas the Caaba is in the middle of the square at Mecca. In order to prevent the people from superstitiously offering worship to the ashes of the prophet, the tomb is inclosed within iron rails, and is only to be seen by looking through these. It is of plain mason-work in the form of a chest; placed between the two tombs, in which are deposited the ashes of the two first caliphs. It is an idle story, of unknown origin, that vast magnets support the coffin of Mahomet in the air. Although it is not more magnificent than the tombs of the founders of most other mosques, the building that covers it is hung with a piece of silk stuff embroidered with gold, which is renewed every seven years by the pacha of Damascus. This building is guarded by 40 eunuchs, chiefly for the security of the treasure which is said to be kept in it. This treasure consists chiefly of precious stones, the offerings of rich Mussulmans. But the account given of this treasure is blended with much fable. Niebuhr was informed by an eminent Arabian, that the guard was posted for no other purpose but to keep off the populace, who had begun to throw dirt upon the tomb, which they afterwards scraped off, and preserved as a sort of relic.

MEDINA, a town of the Arabian Irak, seated on the Euphrates; 60 miles N.W. of Bassora.

MEDINA, a town of Africa, the capital of the kingdom of Woolli; it is a town of considerable size, surrounded by a high wall of clay, guarded by an outward fence of pointed stakes and prickly bushes, and containing from 800 to 1000 houses. N. lat. $13^{\circ} 38'$. W. long. $12^{\circ} 50'$.—Also, a town of Africa, in Kaffan. N. lat. $14^{\circ} 45'$. W. long. $9^{\circ} 15'$.—Also, a small island in the Atlantic, near the coast of Africa. N. lat. $19^{\circ} 45'$.

MEDINA del Campo, *Methymna Campestris*, an ancient town of Spain, in the province of Leon, situated on the Zapardiel, a small river communicating with the Duero, between Toro and Tordefillas. This town was formerly celebrated for the residence of several monarchs, and was then more considerable than it is now, and both commercial and opulent. It has still three considerable fairs, and several great privileges: it is free from all taxes, and the inhabitants have a right to fill all offices, both in the church and civil magistracy, without the interference of the pope or the king. It is still large, though decaying; it has a handsome square, in the middle of which is a fountain ornamented with a statue of Neptune. Medina del Campo is said to have contained 14,000 families, though the number is now reduced to 1000. Although the population is much diminished, the ancient churches and convents are still remaining. According to Townsend it has 9 parish churches, 70 priests, 17 convents, and two hospitals. The collegiate church, built of brick, is much admired for its roof. The old handsome house of the Jesuits is still to be seen. This town was the birth-place of the Jesuit P. J. Acosta, and of the philosopher Gomesius Pereira. Cardinal Ximenes had made this place one of his principal magazines for military stores, collected with a view to curb the great nobility; but when, A.D. 1520, the commons of Castile sought redress of grievances, they seized the magazine, and defended the city with such obstinacy, that they forced Fontesca to retire and to leave them in quiet possession of the ruins. The surrounding country is naturally fertile; 20 miles S.S.W. of Valladolid. N. lat. $41^{\circ} 23'$. W. long. 5° .

MEDINA Celi, a town of Spain, in Old Castile, on the Xalon, anciently called "*Segoucia*." N. lat. $41^{\circ} 21'$. W. long. $2^{\circ} 27'$.

MEDINA del-Rio-Seco, an ancient town of Spain, in Leon, situated on a plain, watered by the river Sequillo. The streets are narrow and ill-paved. It has three parish churches, four convents, an asylum for monks, and two well-endowed hospitals. This place was formerly famous for its population, manufactories, and fairs, on which account it was furnished Little India, in Spanish India-Chica. In 1638, it was honoured with the title of city by Philip IV. It is surrounded by mountains, and the air of it is very salubrious. Its population, which is said to have consisted of 30,000 persons, is now reduced to a fourth of that number. The surrounding country abounds in corn and wine; 15 miles W. of Palencia.

MEDINA Sidonia, a town of Spain, and capital of a duchy, in the province of Seville, anciently the see of a bishop, transferred to Cadiz; 20 miles S.E. of Cadiz. N. lat. $36^{\circ} 25'$. W. long. 6.

MEDINA de los Torres, a town of Spain, in Estramadura; 24 miles N. of Llerena.

MEDINET FARS, a ruined town of Egypt, supposed to have been the ancient Arfinoé, a little N. of Fayoum.—Also, a town of Egypt, on the right bank of the Nile, opposite to Feshn.

MEDINET Habu, or, according to Mr. Bruce, *Medinet-Tabu*, a village of Egypt, near the W. bank of the Nile, where are found the remains of four temples, shewing the place where once stood the magnificent city of Thebes; 28 miles N. of Afoa.

MEDINGEN, a town of Westphalia, in the duchy of Lunenburg; 14 miles S.S.E. of Lunenburg.

MEDINSK, a town of Russia, in the government of Kaluga; 32 miles N.N.W. of Kaluga. N. lat. 54° 58'. E. long. 53° 30'.

MEDIOLANUM, in *Ancient Geography*. See MILAN.

MEDIR, in *Geography*, a town of Persia, in the province of Keruan; 60 miles E. of Sirjan.

MEDITATION, an act by which we consider any thing closely, or wherein the soul is employed in the search or consideration of any truth.

In our religion, it is used to signify a consideration of the objects and grand truths of the Christian faith.

Mythic divines make a great difference between meditation and contemplation: the former consists in discursive acts of the soul, considering methodically, and with attention, the mysteries of faith, and the precepts of morality; and is performed by reflections and reasonings, which leave behind them manifest impressions on the brain. The pure contemplative has no need of meditation, as seeing all things in God at a glance, and without any reflection.

When a man, therefore, has once quitted meditation and is arrived at contemplation, he returns no more; and according to Alvarez, never resumes the oar of meditation, except when the wind of contemplation is too weak to fill his sails.

MEDITERRANEAN, something inclosed within land; or that is remote from the ocean.

MEDITERRANEAN is more particularly used to signify that large sea which flows between the continents of Europe and Africa, entering by the straits of Gibraltar, and reaching into Asia, as far as the Euxine sea, and the Palus Mæotis.

The Mediterranean was anciently called the Grecian sea, and the Great sea. It is now cantoned out into several divisions, which bear several names. To the west of Italy it is called the Ligustic or Tuscan sea; near Venice, the Adriatic; towards Greece, the Ionic and Ægean of the ancients, now the gulf of Archipelago. From this last a strait, called the Hellespont, conducts to the sea of Marmora, the ancient Propontis; and another, now denominated the strait of Constantinople, the ancient Bosphorus, leads to the Euxine, or Black sea; which to the north presents the shallow Palus Mæotis, or sea of Azof, the utmost maritime limit of Europe in that quarter. The breadth of this sea is very various, from 80 to 500 miles; and its length is about 2000 miles to its farthest extremity in Syria. This wide expanse of sea is beautifully sprinkled with islands, and environed with opulent coasts. Tides are not perceivable, except in the narrowest straits; but, according to physiologists, there is a current along the Italian shore from W. to E., and towards the African coast in an opposite direction. In the Adriatic the current runs N.W. along Dalmatia, and returns by the opposite shore of Italy. (See CURRENT.) The chief fisheries of this sea are those of the tunny, of the sword-fish, of the sea-dog, and of the diminutive anchovy. This sea is also the chief seminary of the coral; which see.

According to the learned Buffon, the Mediterranean sea was originally a lake of small extent, and had received, in remote ages, a sudden or prodigious increase, at the time when the Black sea opened a passage for itself through the Bosphorus, and at that period when the sinking of the land which united Europe to Africa, in the part that is now the

straits of Gibraltar, permitted the water of the ocean to rush in. It was also his opinion, that most of the islands of the Mediterranean made a part of the continent, before the great convulsions that have taken place in this quarter of the world. Sonnini, at his request, and with a view of ascertaining his opinion, founded the depth of the sea between Sicily and Malta; and he found the depth from 25 to 30 fathoms, and in the middle of the channel, where the water is deepest, never exceeding 100. On the other hand, between the island of Malta and cape Bon, in Africa, there is still less water, the lead indicating no more than from 15 to 30 fathoms throughout the whole breadth of the channel which separates the two lands.

The British trade carried on by means of the Mediterranean sea is of great consequence to Great Britain; and the permanent preservation of it depends on the possession of the town and fortifications of Gibraltar.

The counterfeiting of Mediterranean passes, for ships to the coast of Barbary, &c. or the seal of the admiralty office to such passes, is felony, without benefit of clergy. Stat. 4 Geo. II. cap. 18.

MEDITRINALIA, among the Romans, feasts instituted in honour of the goddess Meditrina, and celebrated on the thirtieth of September. They were so called from *medendo*, because the Romans then began to drink new wine, which they mixed with old, and that served them instead of physic.

MEDIUM, a Latin term, signifying *middle*, or *mean*.

MEDIUM, in *Arithmetic*, or an *arithmetical medium* or *mean*, called in the schools *medium rei*, is that which is equally distant from each extreme; or which exceeds the lesser extreme, as much as it is exceeded by the greater, in respect of quantity, not of proportion.

Thus nine is a medium between six and twelve.

MEDIUM, *Geometrical*, or *mean*, called in the schools *medium personæ*, is that where the same ratio is preserved between the first and second, as between the second and third terms; or that which exceeds in the same ratio, or quota of itself, as it is exceeded.

Thus, six is a geometrical medium between four and nine. See *Geometrical PROPORTION*.

This is a medium which virtue is supposed to observe; whence some call it *medium quoad nos*, as having a view to circumstances, times, places, persons, &c. Distributive justice observes a geometrical medium; commutative justice, an arithmetical one.

MEDIUM, in *Botany*, a name which has been applied, at different times, to different species of Bell-flower; see *CAMPANULA*. Linnæus retained it for the common biennial Canterbury bell, *Viola maritima* of old authors; because that plant had most generally received this appellation, and was universally believed to be the *mandio* of Dioscorides. The real *mandio* however, though sufficiently well figured under that name, with the synonym of *Mindium Rbafis*, in Rauwolf's Travels, t. 284, was never known to Linnæus, who erroneously referred Rauwolf's plant to his own *Campanula laciniata*. This error was detected a few years since, when the late Andrew Michaux sent seeds of the *Mindium*, or *mandio*, from Aleppo to Paris, and the fine plant they produced was described and figured by l'Heritier, in one of his Monographs, under the name of *Michauxia campanuloides*, in honour of the meritorious botanist and traveller who recovered this long lost rarity. We cannot but think, as we suggested at the time, with all possible respect for M. Michaux, that the ancient name *Medium* ought to have been retained for this newly recovered genus; nor could we wish to call it *Mindium*, with Adanson, the description in Dios-

corides being, in this case, sufficient to leave no doubt; and *Mindium* is apparently a barbarous corruption of an Arabian writer. See *MICHAUXIA* and *MINDIUM*.

MEDIUM, in *Logic*, or *medium of a syllogism*, called also the *mean*, or *middle term*, by the Italians *mezzo termino*, is an argument, reason, or consideration, for which we affirm, or deny any thing: or, it is the cause why the greater extreme is attributed to, or denied of the less, in the conclusion.

Thus, in the syllogism, "Every good thing is to be desired: but all virtue is good; therefore all virtue is to be desired:" the term *good* is the medium: *virtue* the less extreme, and *to be desired* the greater.

It is called medium, as being a kind of mediator between the subject and predicate; or because the extremes are so disposed as to affirm or deny, by means hereof. Some call it *argumentum tertium*, a third argument; and others simply *argumentum*, as being the cause why we assent to the conclusion.

Mediums, or middle terms, are the things principally sought for, in discoursing; so that the invention of mediums makes the most essential part of logic. But the rules commonly given by logicians for that purpose, are mere imperinencies. In effect, no such rules can be given; nor have we any way of coming at such mediums or reasons, but by a close attention to clear ideas.

MEDIUM, in *Music*. Rousseau has made an article of this word in his dictionary, calling it "that part of the voice which is most distant from the extremities of its compass, and which is generally the most full, sweet, and powerful." The same might be said of the middle tones of most instruments. The top of the voice is the most brilliant, but almost always in falset; the bottom is grave and majestic, but less clear and compact. The middle tones of the voice are not only produced with the greatest facility, but are the most melodious and grateful to the ear.

MEDIUM, in *Mechanical Philosophy*, is that space or region through which a body passes in its motion towards any point.

Thus ether is supposed to be the medium in which the heavenly bodies move. Air is the medium in which bodies move near our earth. And water is the medium in which fishes live and move. And glass is also a medium of light, as it affords a free passage.

That density or consistence in the parts of the medium, by which the motion of bodies in it is retarded, is called *the resistance of the medium*; which, together with the force of gravity, is the cause of the cessation of the motion of projectiles.

MEDIUM, *Subtile*, or *Ætherial*. Sir Isaac Newton makes it probable, that, besides the particular aerial medium in which we live and breathe, there is another more universal one, which he calls an *ætherial* medium; vastly more rare, subtile, elastic, and active, than air; and by that means freely permeating the pores and interstices of all other mediums, and diffusing itself through the whole creation; and by the intervention of this he thinks it is, that most of the great phenomena of nature are effected. See *ÆTHER*.

This medium he seems to have recourse to as the first and most remote physical spring; and the ultimate of all natural causes. By the vibrations of this medium, he takes heat to be propagated from lucid bodies; and the intenseness of heat increased and preserved in hot bodies, and from them communicated to cold ones.

By this medium he takes light to be reflected, inflected, refracted, and put alternately in fits of easy reflection and transmission; which effects he also elsewhere ascribes to the power of attraction; so that this medium appears the cause and source even of attraction.

Again, this medium being much rarer within the heavenly bodies, than in the heavenly spaces, and growing denser, as it recedes farther from them, he supposes the cause of the gravitation of these bodies towards each other, and of the parts towards the bodies.

Again, from the vibrations of this same medium, excited in the bottom of the eye by the rays of light, and thence propagated through the capillaments of the optic nerves into the sensory, he takes vision to be performed; and so hearing, from the vibrations of this or some other medium, excited in the auditory nerves by the tremors of the air, and propagated through the capillaments of those nerves into the sensory; and thus of the other senses.

And again, he conceives muscular motion to be performed by the vibrations of the same medium, excited in the brain at the command of the will, and thence propagated through the capillaments of the nerves into the muscles; and thus contracting and dilating them.

The elastic force of this medium, he shews, must be prodigious. Light moves, according to the estimated distance of the earth from the sun in his time, at the rate of considerably more than 70,000,000 miles in about seven minutes; yet the vibrations and pulses of this medium, to cause the fits of easy reflection, and easy transmission, must be swifter than light, which is yet 700,000 times swifter than sound. The elastic force of this medium, therefore, in proportion to its density, must be above 490,000,000,000 times greater than the elastic force of the air, in proportion to its density; the velocities and pulses of the elastic mediums being in a subduplicate ratio of the elasticities and the rarities of the mediums, taken together. And thus may the vibration of this medium be conceived as the cause also of the elasticity of bodies.

Farther, the particles of this medium being supposed infinitely small, even smaller than those of light; if they be likewise supposed, like our air, to have a repelling power, whereby they recede from each other, the smallness of the particles may exceedingly contribute to the increase of the repelling power, and consequently to that of the elasticity and rarity of the medium, and so fit it for the free transmission of light, and the free motions of the heavenly bodies. In this medium may the planets and comets roll without any considerable resistance. If it be 700,000 times more elastic, and as many times rarer, than air, its resistance will be above 600,000,000 times less than that of water; a resistance that would make no sensible alteration in the motion of the planets in ten thousand years.

And is not such a medium better disposed for the heavenly motions than that of the Cartesians, which fills all space adequately, and without leaving pores, and is vastly denser than gold, and therefore must resist more?

If any ask how a medium can be so rare? let him tell how the air, in the upper regions of the atmosphere, can be above a hundred thousand times rarer than gold; how an electrical body can, by friction, emit an exhalation so rare and subtile, yet so potent, as though its emission occasions no sensible alteration in the weight of the body, yet it shall be diffused through a sphere of two feet in diameter, and carry up leaf-copper, or leaf-gold, at the distance of a foot from the electrical body: or how the effluvia of a magnet can be so subtile, as to pass a plate of glass without any resistance or diminution of force; yet so potent, as to turn a magnetic needle beyond the glass. That the heavens are not filled with any other, but such a subtile ætherial medium, is evident from phenomena: whence else are those lasting and regular motions of the planets and comets, in all manner of courses and directions; and how are such motions consistent

consistent with that resistance which must result from that dense fluid medium, wherewith the Cartesians fill the heavens?

The resistance of fluid mediums arises partly from the cohesion of the parts of the medium, and partly from the *vis inertiae* of matter. The first, in a spherical body, is nearly as the diameter, or, at most, as the lactum of the diameter, and the velocity of the body. The latter is as the square of that lactum. Thus are the two kinds of resistance distinguished in any medium; and, being distinguished, it will be found that almost all the resistance of bodies, moving in ordinary fluids, arises from the *vis inertiae*. The part which arises from the tenacity of the medium, may be diminished, by dividing the matter into smaller parts, and making those more smooth and slippery; but the other will still be proportional to the density of the matter, and cannot be diminished any other way, but by a diminution of the same.

Thus the resistance of fluid mediums is nearly proportional to their densities; and thus the air we breathe, being about nine hundred times lighter than water, must resist about one hundred times less than water; as, in effect, the same author has found it does by experiments on pendulums. Bodies moving in quicksilver, water, or air, do not appear to meet with any other resistance but what arises from the density and tenacity of those fluids; which they must, were their pores filled with a dense and subtle fluid.

Heat, it is found, diminishes the tenacity of bodies very much; yet does it not decrease the resistance of water sensibly. The resistance of water, therefore, arises chiefly from its *vis inertiae*; consequently, if the heavens were as dense as water, or as quicksilver, they would not resist much less: if absolutely dense, without any vacuum, be the particles never so subtle and fluid, they would resist much more than quicksilver. A solid globe, in such a medium, would lose above half its motion, while it moves thrice the length of its own diameter; and a globe not perfectly solid, such as the planets, would lose more.

To make way, therefore, for the lasting motions of the planets and comets, the heavens must be empty of all matter, except, perhaps, some very fine effluvia, from the atmospheres of the earth, planets, and comets; and some such æthereal medium as we have described. A dense fluid can serve for no purpose, in the heavens, but to disturb the celestial motions, and make the frame of nature languish; and in the pores of bodies, it can only serve to check the vibrating motion of their parts, wherein their heat and activity consist. Such a medium, therefore, unless we had some evidence of its existence, must be given up; and, that given up, the hypothesis of light consisting in a pression falls also to the ground.

MEDIUM Participationis, in the *Schools*, is that said to be compounded of the two extremes. Thus, man, who is partly body, partly mind, is a medium by participation of the two extremes; so is warmth the medium of heat and cold, &c.

MEDIUM Negationis, or *Remotionis*, is that from which both extremes are derived; or it is a subject capable of receiving both extremes, and yet not necessarily possessed of either.

In which latter sense, the will is a *mean* with respect to virtue and vice; and the understanding, with respect to knowledge and ignorance.

MEDIUM Quod, or *Medium Suppositi*, is somewhat between the agent and patient, which receives the action of the one before it arrive at the other.

In this sense, air is a medium between the fire and the hand heated thereby.

MEDIUM Quo, is the form, or faculty, whereby an agent produces an effect: in which sense, heat is said to be the medium or mean whereby fire acts on the hand.

MEDIUM sub Quo, is that which renders the power to act complete in general, without determining it to any particular object: in which sense, light is the medium under which the eye perceives any colour.

MEDIUM in Quo, is that, by inspection whereof a power is produced in any thing, of knowing or perceiving another: such is a speculum, as it shews an object; an image, as it represents the reality, &c.

MEDIUS, in *Geography*, a town of Persia, in Farsistan; 30 mile S.W. of Yezd

MEDIT'S Harmonicus, Lat. in *Musie*, with the Germans implies the middle sound of a triad or common chord, as E in the chord of C. (Walther.) See **MEDIANTE**.

MEDLAR, in *Botany*. See **MESPILUS**.

MEDLAR, Parsley-leaved. See **SERVIER-Tree**.

MEDLE, in *Geography*, a town of the island of Cuba; 62 miles N. of St. Yago

MEDLERSLO, a small island in the N. part of the gulf of Bothnia. N. lat. 61° 13'. E. long. 21° 39'.

MEDLEY. See **CHANCE-Medley**.

MEDLEY, in *Musie*, during the early part of the last century, a piece of pleasantry, or rather musical buffoonery, was frequently practised by English composers in composing symphonies from fragments of vulgar tunes, and popular compositions, which were called *medley overtures*. Charke, Jack James, and even Arne, in his early days, condescended to divert himself, more, perhaps, than the public, by these musical salmagundies; of which, however, no one of these musicians can be styled the inventor. Dr. Pepusch seems to have given them the hint in his pleasant and appropriate overture to the Beggar's Opera; of which the first movement is a burlesque of the beginning of Handel's overture in Otho; and the subject of the fugue in the first part of "I'm like a skiff in the ocean tost," and the solo passages for hautbois, the second part.

MEDMAN, in *Geography*, a town of the duchy of Berg, containing three churches for persons of different religious profession; six miles E.N.E. of Dusseldorp. N. lat. 51° 17'. E. long. 6° 43'.

MEDNIKI, a town of Samogitia, the residence of the bishop; 28 miles N.E. of Konigsberg.

MEDNOE, a town of Russia, in the government of the Tver, on the Tvertza; 32 miles W.N.W. of Tver.

MEDOC, a county of France, so called before the Revolution, in form of a peninsula, between the Garonne and the sea, the north part of which is overflowed by the sea. On a rock at the mouth of the Garonne is a fine light-house, called "La Tour de Cordouan."

MEDOCTU, a settlement of America, in New Brunswick, situated on the W. side of St. John's river; 35 miles above St. Anne's. N. lat. 46° 12'. W. long. 67° 35'.

MEDOLA, a town of Italy, in the department of the Panaro; 18 miles S. of Modena.

MEDOLI, a town of Italy, in the department of the Mincio; 17 miles N.W. of Mantua.

MEDRA, a town of Africa, in Lower Guinea, capital of a country near the river Camerones.—Also, a town of Persia, in the province of Mekran; eight miles N. of Kich.

MEDRASHEM, a town of Algiers; 40 miles S. of Constantiniana.

MEDSHE-

MEDSHETISAR, a village, being one of the Persian havens on the Caspian, is situated, as is also Farabat, on the southern coast, in the province of Mazanderan. Of these two villages Medshetifar is the most convenient, from its vicinity to Balfrusch, capital of the province, where the Russians and Armenians convey their merchandize: the traffic, however, is much diminished on account of the impositions of the khan of Mazanderan. The chief productions of this country are silk, far inferior to that of Gbilan, rice and cotton, which are largely exported. Merchants from Kashan, Ispahan, Schiras, and Khorafan, resort to Balfrusch, and bring for sale the Persian and Indian commodities.

MEDUA, a town of Algiers, at the foot of mount Atlas, in the midst of springs; 180 miles S.W. of Algiers.

MEDVADITZA, a river of Russia, in the country of the Cossacks, which rises about ten miles N. from Saratov, and runs into the Don, about eight miles N.W. from Spaskaia.

MEDVEDIVA, a town of Russia, in the government of Irkutsk, on the Ilim; 64 miles S.W. of Orlenga.

MEDVEZEL, a cape on the N. coast of Nova Zembla. N. lat. $77^{\circ} 20'$. E. long. $68^{\circ} 34'$.

MEDVEZHI, five small islands of Russia, in the Frozen sea; 60 miles from the mouth of the Kolima. N. lat. 72° to $72^{\circ} 20'$. E. long. about 156° .

MEDVEZI, a small island of Russia, in the sea of Ochotz, at the mouth of the river Uda. N. lat. $55^{\circ} 10'$ to $55^{\circ} 16'$. E. long. 137° to 138° .

MEDUKKA, a town of Arabia, in the province of Yemen; 36 miles S. of Saade.

MEDULLA, in *Anatomy*, the fat substance which fills the cavity in the middle of a long bone. See MEDULLARY *System*.

MEDULLA *Oblongata*, one of the divisions of the contents of the cranium. See BRAIN.

MEDULLA *Spinalis*, the medullary cord contained in the canal of the vertebræ. See BRAIN.

MEDULLA, in *Vegetable Physiology*, the Pith of plants, is lodged in the centre or heart of the vegetable body, where it is as assiduously protected as the brain and spinal marrow of animals. In parts most endowed with life, like the root, or especially young growing stems or branches, the *medulla* is usually of a pulpy substance; but tolerably firm though rather brittle. Its colour is pale green or yellowish, with a watery transparency, the substance being very juicy. Its juices partake but little, or not at all, of the peculiar flavour of the plant, they being more of the nature of sap. Still there is no perceptible flowing from this part when wounded, at any time of the year, as far as we have observed. In branches or stems more advanced in growth, the *medulla* is found of a drier, more white, and evidently cellular texture. In this state it is known to every body in the full-grown branches of Elder, and the stems of Rushes, *Juncus conglomeratus*, *effusus*, &c. In these it is dry, highly cellular, snow-white, extremely light and compressible, though but slightly elastic. Such are its different appearances, at different periods of growth, in many common shrubs, as the Currant-tree, Lilac, Mock-orange, *Hydrangea*, &c. In the last-mentioned shrub, though nearly akin to the Elder, as well as in the *Aucuba japonica*, the pith is very abundant, and remains unusually long in its primary green juicy state. The pith of many annual stems, abundant and highly succulent while they are growing, becomes little more than a web, lining the hollow of the adult stem, as in some Thistles.

Many Grasses and Umbelliferous plants, as the Hemlock and Chervil, have always hollow stems, lined only with a thin smooth coating of pith, exquisitely delicate and brilliant in its appearance. The inner part of such hollow stems is, in some instances, divided into separate cavities, by transverse partitions. Such is the case at every joint, knot, or subdivision of the stem. There are a few grass-like plants, with unbranched hollow stems, internally divided by numerous membranous partitions, perceptible to the touch in the living plant, and to the sight in the dry one; witness *Juncus articulatus* and its allies, in which the longitudinal hollow of the stem is simple; and *Cyperus articulatus*, in which it is a congeries of parallel tubes. We mean not to say that the tubes in this last-mentioned instance are certainly medullary. They may or may not; but observations on the living plant could alone determine this. It is possible they may be sap-veins, and that the transverse stricture is not complete, so as to prevent the passage of fluids along this highly vascular substance. But as other species of this tribe have the central part of their stems filled with cells, or tubes frequently interrupted, through which no fluid can run, it is most probable that *Cyperus articulatus* differs from such merely in having all its tubes interrupted at the same point of elevation, and that the assemblage of numerous partitions gives a frequently jointed appearance to the whole stem. *Andromeda acuminata*, Sm. Exot. Bot. t. 89, is found to have its hollow stem intercepted by very numerous transverse partitions; and the same may be seen in other instances. The distinction between a hollow stem, only lined with *medulla*, and a solid one, entirely filled up with that substance, by no means indicates any material difference between the plants so circumstanced. Some species of *Hieracium* have the one sort of stem, others the other, and this difference is often of use, for specific distinction, in that difficult genus.

It is much easier to describe the appearances of the *medulla*, which are few and but little varied, than it is to understand the true nature, or physiology, of this part. There is scarcely any concerning which a greater variety of opinions, or at least more opposite ones, have been held.

Du Hamel, an excellent observer, though not always a correct theorist, considered this part as not in any respect different from the rest of the cellular substance, dispersed through the vegetable body, and serving to hold its different parts together; nor did he attribute any particular function, in the vegetable economy, to any part of this substance.

Linnaeus on the contrary thought the *medulla* the seat of life, and prime source of vegetation. He conceived that its vigour was the main cause of the propulsion of the branches. His lively fancy formed to itself an idea of this organ altogether his own, as a living body of peculiar vivacity and energy, striving to enlarge itself in every direction, and succeeding best where it found least resistance. Thus he explains the growth of plants, and especially of trees, at their extremities only; the cortical substance, as he terms it, of the vegetable being, (consisting of its wood and bark, including the vascular system,) affording less resistance where it is younger and thinner, while it derives energy itself from the powers of the substance it confines. His idea of the animal physiology was similar. He conceived the brain and nerves of animals to be analogous to the pith of plants, and that it was confined by their cortical substance, for so he called their bones and muscles, as the pith is by the more solid parts of plants. He thought he traced the origin of the stamens, or male organs of vegetables, to their wood; and that of the pistils, or female ones, to their pith. Hence he deduced

deduced a fine fanciful hypothesis, that the mule offspring of crows impregnation should resemble its father in external habit and characters, and its mother in internal qualities, which opinion he also extended to the animal creation; nor did he want facts to support it. Both kingdoms were ransacked to supply them; for some facts may be found to support any hypothesis, any at least conceived by a mind so able, ingenious, and intelligent as that of Linnæus. Mule animals, whether those properly so called, produced between different species, or whether those engendered between varieties of the same species, are often found to resemble the father in their form or coat, while their constitution and disposition are more like the mother. The same thing may be observed in mule plants. Linnæus is unquestionably right in attributing the origin of the substance of the seed of plants to the female part of the flower, the function of the pollen being only to communicate life, or a power of vegetation, to the embryo, and not to convey any substance, or corpuscule, out of which the rudiments of the future plant are to be formed. At least this seems the most reasonable opinion, even from a contemplation of the experiments of those who have laboured to overthrow altogether his doctrine of the sexes of plants. It is difficult to say whether the embryo of a seed be formed at all before impregnation, because, if formed, it is very soon obliterated in case impregnation fails, a mere cavity being found in its place when the seed is at all advanced. But we have seen much more reason to believe its obliteration, rather than the contrary; and in most cases of non-impregnation, the cotyledons are obliterated also. See *COTYLEDONES, EMBRYO, and FECUNDATION of Plants.*

In another office which he attributed to the *medulla* or pith, Linnæus was unquestionably mistaken. He thought it the origin of the wood; believing that a layer was every year added internally to the body of a tree from this substance. Du Hamel refuted this opinion, by experiments, which clearly proved the wood to be deposited by the bark, as we have explained in the articles *CORTEX, and CIRCULATION of the Sap.*

But while we thus reject opinions of the great Swedish naturalist, which have been proved to want a solid foundation, it may be worth while to examine how far his general idea of the importance of the *medulla* may be defensible. No one can deny that there is a great analogy between this part and the nervous system of animals, with respect to situation and protection, as well as in its general uniformity of appearance and texture in widely different orders of plants; while the differences in these respects which it exhibits in other tribes, are not at all greater than those found in the nervous systems and brains of different classes of the animal kingdom. If, moreover, it be said, that the pith is of too simple a construction to allow a belief of its being of so great importance to the vegetable constitution, as to be the seat of life, or immediate organ of vegetation; surely we are as little able to discover any thing in the form or texture of the brain and nerves, to account for their wonderful but undeniable properties. Scarcely any phenomenon in the animal frame is less intelligible, than the change in the pith of a plant from its succulent state, to that dry congeries of an infinite number of close cells or vesicles, impervious to fluids, and having no communication with each other. Yet the moisture escapes by no means readily from the pith in its juicy state; for a thin slice of it in that state dries very slowly. The ingenious Mr. Knight has supposed the *medulla* to be a reservoir of moisture, to which the growing vegetable may have recourse, when its sap-vessels are occasionally exhausted by inordinate perspiration. "Plants," says this excellent writer, "cannot, like animals, fly to the

shade and the brook." This is undoubtedly true; but, instead of such a resource, their leaves when exhausted droop, or fold over each other; so that their pores are contracted, and the very check which their energy receives prevents further exhaustion, and gives time for fresh supplies from the root. Mr. Knight has indeed shewn that the part in question may, occasionally at least, be dispensed with, and removed from a branch without injuring it; but, on the other hand, he has more recently shewn the importance, if not of the *medulla*, of its analogous organ, the cellular substance; having found that substance capable, as he thinks, of assuming the vascular structure, and actual vegetation, of what Linnæus terms the cortical substance of a plant.

The writer of the present article has always been partial to the opinion of the *medulla* being, some how or other, an organ subservient to the vital energy of the vegetable frame; but we can still less, if possible, comprehend its mode of action, than that of our own brain and nerves. It is branched off and diffused, like the nervous matter, to every part of the vegetable body, and hence may easily be supposed to give life and vigour to the whole, though, no more than nerves, the organ or the direct source of nourishment; for its structure is such that it can transmit no fluids for that purpose from the vascular system; at least not in any way that we can comprehend, till it has taken upon itself a different organization from what is natural to it. The pith however is certainly most vigorous and abundant in young and growing branches, and must be supposed subservient, in some way or other, to their increase. Mr. Lindfay of Jamaica (see *LINDSÆA*), many years ago communicated a paper to the Royal Society, which, for some reason unknown to us, was never printed, the object of which was to prove a medullary knot in the leaf-stalk of the *Mimosa pudica*, or Sensitive Plant, to be the seat of that remarkable irritability for which the plant in question is celebrated. We are not however able to trace any thing of this nature in the stems of the Barberry, which are no less remarkable for their irritability. Nor can we trace, to any great extent, the nervous system of the insect tribe, even where we are not prevented by the minuteness of the object of our examination; though the animals of that tribe yield to none in the susceptibility and energy of their nervous system. In both cases the transparency of the parts may account for this difficulty.

We can therefore only reason by analogy concerning the functions of parts, whose structure cannot be ascertained, much less their mode of action. We shall conclude this article with the mention of one phenomenon, easily observable by any person who will bestow attention upon it. There are several species of Grasses, amongst which are the Common Cat's-tail, *Phleum pratense*, and the Floating Fox-tail, *Alopecurus geniculatus*, whose nature is to have an entirely fibrous root. Their proper station is in moist, or even watery situations. But if they chance to establish themselves in ground whose degree of moisture varies occasionally, or especially in very dry spots, as on the top of a wall, they acquire bulbous roots, of a very juicy nature. This is evidently a provision of Nature, to guard the plant against destruction from drought; as the tribe of naturally bulbous plants are, for the most part, intended to occupy dry, sandy, or barren ground, under a burning sun. The naturally bulbous grass *Poa bulbosa*, if cultivated in the rich and regularly watered soil of a garden, gradually loses its bulbous habit, becomes excessively luxuriant, and in time perishes, in consequence of exhaustion from that very luxuriance, to which the annual formation of bulbs, in its proper sandy situation, is a seasonable check. All these instances surely prove

prove the accumulation of *medulla* in such bulbous roots, to be equivalent to an accumulation of vital energy. They cannot be mere reservoirs of moisture, for all that they can possibly contain is not adequate to the supply of a few minutes perspiration from the herbage. They may indeed husband that moisture, so as to render the scanty supplies obtained by the fibres below, or by absorption through the leaves, sufficient to keep the half-starved plant from absolute destruction; their own extraordinary luxuriance proving the salvation of the parts which they seem to starve, but to which they are a necessary and certain resource. The just consideration of fleshy roots in general will be found to illustrate this subject; for though those of biennial plants must be considered as reservoirs of nutriment, hoarded up by the growth of the first season, for the inordinate supply of the next; the physiology of perennial bulbous roots seems to indicate, that all are likewise reservoirs of vital energy, of which the *medulla* is the immediate organ, and probably the exclusive residence. S.

MEDULLARY ARTERIES, in *Anatomy*, the arteries distributed on the substance which fills the interior of bones. See **MEDULLARY System**.

MEDULLARY Substance, is the white matter of the brain and nerves. See **BRAIN**.

MEDULLARY System, is the expression employed by Bichat to denote the tissue that occupies the interior of the bones. Its organical arrangement, vital properties, functions and diseases, are imperfectly understood. Some remarks on it will be found under the article **BONE**. It is found only in the bones, and its uses seem only relative to those organs: yet its organization and properties are so different as to justify us in considering it separately.

There are two kinds of it very distinguishable from each other: one occupies the cellular structure in the extremities of the long bones, and in all the interior of the short and flat bones: the other is found only in the middle of the former.

The first appears to consist of the ramifications of those vessels, which enter by numerous small holes of the surface into the common cellular tissue of the bone. They divide very minutely on the internal surfaces of the cells, producing the red appearance which characterizes that part, and which is more strongly marked in proportion as the subject is younger. To them, and the blood which they contain, is owing the red colour of the powdery substance produced in sawing through a bone. Fine injections propel the blood contained in this tissue, and make it appear in the adult as red as that of the fœtus when uninjected.

Authors have generally admitted the existence of a fine membrane in these bony cells, and have assigned to it the office of exhaling the medullary fluid. Bichat represents it as a merely vascular texture, without any continuous surface; and observes, that the bone itself, in many points, is in contact with the medullary fluid. It possesses merely the organic sensibility and contractility necessary for the secretion of its fluid, and is distinguished in that respect from the medullary system of the middle of long bones, which is the seat of well-marked animal sensibility. There is no sign of pain when it is irritated in a living animal. If it be very extensively injured, necrosis may ensue: but smaller injuries have not this consequence. Bichat perforated the extremity of a long bone in an animal, and then introduced a hot wire: it healed without necrosis.

The vascular network forming this system is obscured in the cartilaginous state of the bone by the gelatine: as that is removed, the cells and vessels become manifest. In the fœtus, and in the early years of life, it contains no oily fluid: at this time the blood is more abundant, and the cells are

filled with some fluid, of which the nature is not well understood. Medullary oil is afterwards deposited, and its proportion increases until the growth is completed. The cellular structure of an adult bone exposed to a pretty considerable heat parts with a large quantity of oily fluid: the same experiment tried on a fœtal bone produces only desiccation of the tissue from evaporation of its fluids. When the extremity of a long bone of the adult is set on fire, the contained medullary substance keeps up the combustion; in the fœtus, the bone ceases to burn as soon as it is removed from the fire, as the fluids will not maintain the combustion. The bones, when dried, remain white and dry in the fœtus: they are yellow and greasy in the adult at their extremities. Ebullition extracts much oil from the cellular tissue of adult bones, but none from those of the fœtus.

The second medullary system occupies the large cavity in the centre of the long bones. Each of such cavities is lined by a thin membrane, prolongations of which cover the thin portions of cellular tissue that project into the cavity, or pass from one side to the other, and form cells in which the medullary fluid is contained. The situation in which it exists, gives to it, when considered altogether, a nearly cylindrical form.

It does not appear that the ends of this system have any communication with the former: the two are separated by a marked line of distinction, and not gradually confounded: yet it is difficult to prove the point clearly.

The great delicacy of the membrane conceals the nature of its texture: it cannot be referred either to the serous, mucous, or fibrous class, and has no analogy in its functions, &c. with the periosteum, to which it has been often compared. A principal artery enters at the chief hole of each long bone, and ramifies on this membrane. Its branches give it, in the fœtus, a reddish colour, which disappears afterwards. Exposure of the containing cylinder to fire renders the membrane more apparent by corrugating and curling it up.

We have no means of bringing the properties that arises from structure (*propriétés de tissu*) in this system under our observation.

It enjoys animal sensibility in a very considerable degree, as we may prove by introducing a probe into the medullary cavity of a bone, by injecting an irritating fluid, or using any other mode of irritation.

The secretion and absorption of the medullary fluid prove the existence of organic sensibility, and of insensible organic contractility.

It is obvious from the preceding account, that the vital powers are more active in this than in the bony system, consequently that the vital phenomena must be more rapid, and the diseases less prone to assume the chronic form, than those which affect the bones.

The medullary membrane appears to exist in the cartilaginous state of the middle of long bones; but gelatine is then deposited in it, so that the whole bone is homogeneous in appearance. When ossification begins, the gelatine is absorbed, and the medullary cavity formed: the membrane admits red blood. At first, however, no oily matter is deposited in the cells: instead of it, there is a reddish mucilaginous fluid, which exhibits nothing of a greasy appearance when pressed between the fingers. No particles of oil swim in the water after it has been boiled. The middle of a long bone exposed to heat burns with the formation of inflamed drops: nothing of this kind occurs in the fœtus.

The function of the medullary membrane is to deposit, by exhalation, the medullary fluid, and to convey it again into the blood by absorption. It must therefore possess

exhalants and absorbents as well as blood-vessels, although we cannot demonstrate them anatomically. In this point of view the medullary system resembles the fat. It is hardly possible for us to know whether the exhalation be augmented or diminished by any causes. It is however certain, that in phthisis, dropsy, or other affections in which extreme general debility is produced by a gradual reduction of the vital powers, the medullary fluid loses its essential characters, and assumes an appearance altogether different from its natural one, without any alteration in the texture of the membrane. It has a mucilaginous or gelatinous appearance, almost like that of the fœtus.

That the medullary membrane has a close connection with the nutrition of the bone is rendered evident by the experiments of Proja, in which it is shewn that its destruction is followed by the death of the bone, and the formation of a new one, to which the periosteum serves as a nutritive parenchyma. The common way of proceeding has been to saw off the extremity of a long bone, and to introduce a red-hot wire into the medullary cavity, so as to disorganize the part completely. Soon after the periosteum swells, becomes inflamed, and extremely sensible to the touch. The inflammation disappears, and the sensibility is gradually rendered less acute. The internal layers of the membrane receive a deposition of gelatine, and thus a cartilaginous sheath is formed including the dead bone. After a certain time, of which the length may vary from many causes, phosphat of lime is deposited, and converts the cartilaginous into a bony sheath. The inner bone is now a dead body surrounded on all sides by a living one. Bichat, *Anatomic Generale*, tom. ii.

MEDULLARY Sarcoma, in *Surgery*, a name given by Mr. Abernethy to a kind of sarcomatous swelling, the consistence of which resembles that of the medullary substance of the brain. It is supposed by some to be a species of fungus hæmatodes. See **FUNGUS** and **TUMOUR**.

MEDUMACK, in *Geography*, a river of America, in the district of Maine, which runs into the sea, N. lat. 44°. W. long. 69° 15'.

MEDUNA, a town of Italy, in the country of Friuli; 12 miles W. of Concordia.

MEDUNCOCK, a plantation of America, in Lincoln county, Maine; 40 miles E.S.E. of Wiscasset, containing 380 inhabitants.

MEDUS, or **MEDINUS**, a name given by the writers of the middle ages to a stone brought from Media, of which they say there were two kinds, the one black, and the other green. They attribute many strange virtues to these stones; the black they say was a fatal poison when taken inwardly, but that if wetted with milk, and rubbed upon the skin of a woman with child, it caused her to bring forth a boy. This seems to be only a false history of the *medea* of Pliny.

MEDUSA, in *Botany*, is a name bestowed on this genus by Loureiro, from the long curling hairs of its capsule resembling the snakes which are fabled to have covered the head of Medusa. This name however is untenable, from its having been previously applied to designate a genus of *Vermes*. We are only acquainted with this plant as it occurs in Loureiro, and being unable to refer it to any other genus, we must be content to give that author's account of it.—Loureir. *Cochinch.* 406.—Class and order, *Monadelphia Polyandria*. Nat. Ord.

Gen. Ch. *Cal.* Perianth inferior, permanent, of five, ovate, hairy, incurved, spreading leaves. *Cor.* Petals five, ovate-oblong, curved, inflexed, afterwards reflexed towards the top, longer than the calyx. *Stam.* Filaments five,

thread-shaped, united at the base into a tube, equal in length to the corolla; anthers incumbent. *Pist.* Germen superior, nearly round; style awl shaped, hairy, the same length as the stamens; stigma simple. *Peric.* Capsule ovate, three-lobed, covered with numerous, long, twisted hairs, of one cell and three valves. *Seeds* six, roundish.

Ess. Ch. Monogynous. Calyx of five leaves. Petals five. Capsule with one cell, three valves, and six seeds.

1. *M. anguifera*. Snake-bearing Medusa. Cay chôm chôm dát, of the Cochon-Chine. Loureiro.—A tree of middling size, with ascending branches. Leaves alternate, ovate-oblong, serrated, pointed, smooth. Flowers red, not many on a stalk. Capsule hairy, opening in three lobes, which expand horizontally.

MEDUSA, in *Natural History*, a genus of the *Vermes*, *Mollusca* class and order, of which the generic character is, Body gelatinous, orbicular, and generally flat underneath; the mouth central, beneath.

The animals of this genus have been commonly denominated "sea-nettles," from the opinion that the larger species, when touched, excite a tingling sensation, and a slight redness of the skin: they are supposed to constitute the chief food of ectaceous fish; and most of them shine with great splendour in the water. The form of their body, while at rest, is that of the segment of a sphere, of which the convex surface is smooth, and the flat part provided with several tentacula. The body is transparent, and so gelatinous, that it is reduced almost to nothing by evaporation, when left on the shore. Several coloured lines may be seen within, but there is nothing that would lead one to think there is a circulation going on. The lines, which are more numerous towards the borders, seem to be appendages of the alimentary cavity. These animals swim well, and appear to perform that motion by rendering their body more or less convex, and thus striking the water. When left on the shore they are motionless, and look more like flat cakes of jelly, than living animals. There are about forty-four species distributed into two sections, viz. A. Body with ciliate ribs: and B. Those that have a smooth body. Many of the species are to be found in the seas about our own country, and will be marked as such with asterisks.

A. Body with ciliate Ribs.

Species.

INFUNDIBULUM. The specific character of this is, body ovate, with nine ciliate ribs. It inhabits the Indian, Mediterranean, and North seas; is about three inches and a half long. The body is obtusely eight-angled, hollow, transparent, open at the larger extremity, and of a firm gelatinous substance. It contracts and expands with great facility: ribs purplish, and furnished with a single row of short and slender fibres.

PILEUS. The body of this species is globular with ciliate ribs, and two ciliate cirri. It is found in the Mediterranean seas.

CUCUMIS. This is oblong with eight ciliate ribs, with cirri. It is found in the Greenland seas, and moves very slowly by means of the fibres on the ribs: when touched it contracts itself into the form of an apple. The body is white mixed with blue, and covered with irregular red spots: it has two apertures, terminal meeting in the oblong middle cavity. It probably derives its name from its shape and appearance.

OVUM. Ovate, with eight ciliate ribs and two pair of cirri, one pair of which is very long. Inhabits the Greenland

MEDUSA.

land seas, and resembles a bat, seldom larger than a pigeon's egg. The body is lucid and exceedingly fragile; the fragments, while alive, are blue.

B. *Body smooth.*

Species.

PORPITA. The body of this species is flat above, beneath it is a little convex, grooved, and villous. It is found in India.

* **CRUCIATA.** This species has a body marked with a milk-white cross. It inhabits the European seas. It has the appearance of a transparent colourless jelly; the body is furrowed at the margin with very fine fibres; the cross is marked with a brown spot on each arm. It is luminous when under sun-shine.

HYSOCELLA. The body is convex, having sixteen rays, and four united tentacula beneath. It is found in the sea round Portugal. The body above is whitish, the rays composed of extremely minute reddish-brown dots; beneath it is concave; the tentacula are longer than the body, lanceolate, and marked with reddish striæ.

* **ÆQUOREA.** This is a flattish species, with a villous inflected tentaculate margin. It is extremely simple, soft, and fringed at the margin with white.

* **AURITA.** Convex above, with an inflected fringed margin; beneath with four arched cavities near the centre. It is frequently found floating on the surface of the sea; is from two to four inches in diameter. When the sun shines upon the animals of this species, they reflect a beautiful splendour.

* **CAPILLATA.** The body is convex, with sixteen indentations round the margin, and numerous slender filaments beneath. It inhabits the ocean, and is about eight inches in diameter. The body is described as whitish, semi-pellucid, fragile; above convex, beneath flat with a rough circle; within this there are eight pair of rays; and a number of curled fibres and appendages from the centre: the margin is divided into eight portions, each of which is emarginated.

* **PILARIS.** This has a capitate disk, with eight small holes on the border: beneath it is arched and hairy. The body has an irregular reflected margin.

MARSUPIALIS This is found in the Mediterranean; is semi-oval with four tentacula on the margin, and resembles a puffer.

HÆMISPHERICA. This, as its name denotes, is hemispherical, with four transverse ribs beneath, and marginal tentacula and globules: the margin is entire: is not a quarter of an inch in diameter, and is found in the European seas.

PELAGICA. Hemispherical-concave, with a crenate incurved margin and eight tentacula. It is found in the American and Atlantic seas.

NOCTILUCA. This species is depressed, with reddish-brown warts and dots: margin with eight red tentacula.

* **FUSCA.** The body of this has sixteen brown rays and a brown circle in the middle; the circumference is edged with alternate crooked fangs and oval tubercles. It inhabits the coast of Cornwall. The tentacula are four, lacerated, and a little exceeding the body.

* **PURPURA.** The body of this species is decorated with pale purple rays, and a light purple cross in the centre, between each bar of which is a deep purple horse-shoe-shaped mark.

* **TUBERCULATA.** With fifteen brown rays meeting at the centre, and small oval tubercles round the margin; it

has four tentacula plain, and much longer than the body. It inhabits the coast of Cornwall.

* **UNDULATA.** This derives its name from its undulate margin; it has fangs on the projecting parts; beneath it has four orifices, between which is a stem divided into eight ragged tentacula. It is found on the coast of Cornwall.

* **LUNULATA.** The margin is tuberculate; beneath in the centre are four conic appendages forming a cross, with several others, like ferrate leaves, furrounding it. The tentacula are eight, not longer than the margin, and between each is a semi-lunar aperture. It inhabits the coast of Cornwall.

NUDA. Orbicular, blue, without crest; the tentacula of the disk are naked, with three rows of glands. It is found in the Mediterranean, and is never an inch in diameter. The body has a whitish disk above, and radiate with concentric striæ, the margin and border blue; the tentacula are filiform and blueish-hyaline.

VELELIA. This also is orbicular, blue, with an oblique simple crest or membrane, and numerous tentacula beneath. It inhabits the Atlantic and Mediterranean seas. The body is flat, thin oval, and marked with numerous tentacula beneath.

SPIRANS. Oval, blue, with oblique divided crest or veil, and numerous tentacula beneath. It is about two inches long, and inhabits the Mediterranean. Body thin, convex, and terminating in a whitish central knob above, blue with a brown border; crest two-parted and striate; the tentacula are filiform.

PULMO. Hemispherical-concave, with a fringed border; beneath striate, the stem with four openings and eight arms. It inhabits the Tuscan sea. This has been very minutely described in the following terms:

"Body gelatinous, pellucid, tough, crystalline. The head is large, hemispherical, concave beneath, and marked with numerous striæ, crossed by sixteen distant ligaments, each emitting a short branch on both sides. Border fringed with numerous roundish scallops. Stem large, thick, square, with four semi-oval openings, each of which has a large lobe above, and a smaller beneath. Eight branches or arms proceeding from the lower part of the stem, sub-cylindric, pendent, and wrinkled behind; besides these, there are sixteen subtrigonal appendages rising from the beginning of each branch, bisid in front, and terminated on the upper side by a flat wrinkled surface; the branches end in as many sub-pyramidical branchiæ, the two exterior sides of which are prominent, and ending in a thickly wrinkled surface: these are terminated by eight oblong sub-triangular thick pendent bodies, ending in three flat acute membranaceous pieces. Within the openings is a flexuous striate blueish-yellow band."

TYRRHENA. This, as its name imports, is found in the Tuscan sea. It is convex; the margin crenate, and furnished with very long fibres or threads; beneath are four tentacula. The body is smooth, tender, hyaline, spotted with red; beneath are four cavities, each marked with a red band.

TUBERCULARIS. The disk of this is prominent; the margin is eight times divided and striate beneath; it has eight tubercles. It is found in the Tuscan sea. The body is hyaline, and it is often two pounds weight; beneath fulvous, with innumerable curved fibres; tubercles blueish-white, ending in two stems, terminated by a pellucid whitish membrane, which is flaccid and blue or white at the tip.

UTRICULUS. This species is bottle-shaped, with a very long

long granular central tentaculum beneath; margin with numerous blue tentacula tipped with white. Inhabits the ocean; is hyaline, with about thirty marginal cirri.

CARAVELLA. Body ovate, with very long central tentacula beneath, and a crenulate veil above. It is found in the Atlantic, and inflames the hand by its touch. The body is thin, smooth, shining, blueish, hyaline, and tapering on each side; the crest runs through the whole length of the back; it is semi-lunar, compressed, furrowed with branched grooves, and marked with rosy veins; tentacula jointed, blue, fragile, and intermixed with shorter tubercles.

UMBRELLA. Tentacula of the disk naked, of the margin glandular; margin membranaceous, crenate. Inhabits the Mediterranean and Indian seas. The body is rigid, depressed, with radiate grooves above; beneath with a clavate trunk in the middle, surrounded with short clavate tubes; tentacula jointed with three rows of glands.

DIMORPHA. Back eminent; beneath a minute cross surrounded with five apertures; the margin is ciliate. It is found in the North seas. The body, when expanded, is orbicular, with a square inflexed margin; beneath it is concave; the back is divided into four parts by radiate grooves, with an elevated central cross and white fibres.

CAMPANULA. The disk is gibbous; the border wide and ciliate; beneath is a hairy cross. It inhabits the Greenland seas. The body is conic-orbicular, beneath hollow and foamy; the fringe of the margin and cross yellow; the latter is often white.

DIGITATA. Hyaline, with a pitted beneath in the centre; margin ciliate. An inhabitant of the Greenland seas. It leaps with its margin bent in. Body very minute, conic, striate; fringe yellow or white, and hooked within; pitted ending in a yellow or white pencil.

FRONSOSA. Margin of the disk varied with white opaque spots; it has eight tentacula, is dichotomous, and is beset with white pedunculate warts terminating in tufts. It is small, and found in the Archipelago. The body is flattish, a little convex above; the border is membranaceous, and fringed with white fasciculi; beneath is a villous nucleus, which in the lesser ones is eight-angled, and in the larger ones ten-angled.

TETRASTYLA. This is hemispherical, without tentacula; furnished with four marginal tubes united into a prism. It is found in the Red sea, and is about a span and a half across. Body hyaline, rather rigid; the tubes of the margin are linear, three inches long, straight and flat.

OCTOSTYLA. Hemispherical, without marginal tentacula; beneath is a four-folded column, with eight many-cleft lobes at the tip, and sixteen lateral appendages. This is likewise found in the Red sea. The body is of a blueish-hyaline, and is a full foot in diameter; the column beneath is about an inch and a half long.

ANDROMEDA. Hemispherical, without marginal arms; beneath there are eight round ramified foliaceous arms. An inhabitant of the Red sea. The body is transparent, of a pale yellowish-brown or blueish colour, with white rays and an entire margin; in the middle is a small black cross; the arms are white, and a little thicker than a goose-quill at the insertion.

CORONA. Hemispherical, without marginal tentacula; beneath there are eight cultrate arms, toothed each side below. It inhabits the Red sea. Body reddish-hyaline; it is about four inches across, with a blue cross in the middle; the arms beneath are broad, and two-lobed at the tip.

PERSEÆ. Hemispherical, hyaline, with an opaque white ring within, four times interrupted; there are no marginal tentacula. It is found in the Mediterranean. The body is

about two inches wide, with a very prominent margin; it has four arms, sub-lanceolate, about an inch long, and undulate at the margin.

CEPHEA. Hemispherical, tuberculate, reddish brown; beneath are eight arms villous at their extremities, and nine long filiform tentacula. It inhabits the Red sea. The body is pellucid, with eight paler rays; arms blueish, with black extremities; the tentacula are pointed.

PHRONOSIDALIS. Hemispherical, with a long proboscis in the middle beneath, and six marginal tentacula. This species inhabits the Mediterranean. The body is hyaline, two inches and a half broad, with a prominent equal margin; proboscis sub-flexile, and truncate at the tip, with a fringed folded versatile membrane.

MOLLICINA. Depressed, with twelve lateral apertures and tentacula. An inhabitant of the Mediterranean. The body is about an inch and a half in diameter, hyaline; the margin is prominent, with twelve plates.

PLEATA. Ovate-campanulate, with a hyaline globe above; within is an oblong red nucleus; the margin has numerous tentacula that are yellow at the base. Inhabits the Mediterranean. The body is an inch and half high; the margin a little contracted.

CUCIGERA. Hemispherical, with a reddish cross as wide as the body; the body is small, with four very minute, white, approximate rings above; the margin is thin, prominent, variously flexile, and often reddish; the tentacula are numerous, but not so long as the body is wide.

UNGUICULATA. Orbiculate; above flat, with sixteen rays; the margin is crenate, with sixteen slightly incurved fangs. It is found about the shores of Jamaica, and is the size of a nutmeg. The body is diaphanous, blueish, and spotted.

For a description of several of the above species, as affording an exhibition of light, and for an account of certain changes, recommended by Mr. Macartney, in the arrangement of the genera, and of the names of some of the species, we refer our readers to the article *LIGHT, Exhibition of, by living Animals*, at the close of the 20th volume of this work, having, in the present, confined ourselves to the Linnæan representation of the genus.

Mr. (now Sir Joseph) Banks, in his passage from Madeira to Rio de Janeiro, discovered a new species of the medusa, which, when brought aboard by the casting net, had the appearance of metal violently heated, and emitted a white light. With these animals were taken small crabs of three different species, altogether new, each of which gave as much light as the glow-worm, though the creature was not so large by nine-tenths. These luminous animals gave that appearance to the sea, which has been mentioned by many navigators, and of which various reasons have been assigned. It appeared to emit flashes of light exactly resembling those of lightning, only not so considerable, but so frequent, that sometimes eight or ten were visible at the same moment.

MEDUSA'S Head, in Botany. See *EUPHORMIA*.

MEDUSÆ CAPUT, in Natural History, a name given by authors to the *Stella marina*, called by some, from its various branchings, *Stella arborescens* Rumphius, Gesner, and many other authors, have described this strange fish in its recent state; and in the *Acta Eruditorum*, we have an accurate figure, and a very remarkable account of one which was found fossil, and preserved in a singularly perfect manner in stone.

The stone in which it was found was of the fissile or flaty kind; and it was so large as to extend over a piece of this stone of four feet in length, and between three and four in breadth. The body of the fish, from which all the rest seem

originally to have arisen, lay at one corner of this stone, and the arms extended themselves lengthways in a very distinct and natural manner the whole length of the stone; and from these there parted, on every side, other smaller ones; and these were finally divided into others more minute, in such a manner as to represent the nicest painting. *Act. Erudit. ann. 1725, p. 377.*

The study of fossils is more improved by this single specimen than by thousands of others, and by the reasonings of almost as many authors. The fossils called *entrochi* have always perplexed the writers on these subjects to account for: some having judged them a sort of stony vegetables; some a *lusus naturæ*; and others, as different things; but in this table the whole fish is so perfectly preserved, that there can remain not the least doubt of its being really the *stella arborescens*; and in this both the figure and author's words express, in the plainest manner possible, that the long arms or branches, reaching from one end to the other of the stone, are composed of a number of *entrochi* as it were, tied together in the same manner as the single joints of those *entrochi*, which we meet with, are to one another: or, in plain fact, that our *entrochi*, which have perplexed us so much to account for their origin, are in reality the fragments of the arms or branches of this fish. These branches in this famous specimen were composed of what we call *trochite*, and had many rudiments of smaller branches, as well as perfect ones, growing from their sides, and would have been so many common *entrochi*, if broken off.

What was most remarkable in this fossile was, however, the separating of smaller branches which ran entire to their ends, and there terminating in an infinite number of small ramifications, all growing from one head, they formed clusters of four or five inches in diameter, and of an inconceivable beauty, resembling the compound flower of some elegant plant. The matter of the large branches, when examined, appeared to be the same with that of the common *entrochi*, that is, spar. The author calls it *selenites*, but that was a word indeterminately used by authors, till of late, for all plated and bright fossils.

It is plain that this complete fish could have no way come into this stone but at the time when it was yet moist and soft: and the author calls it *novum diluvii monumentum, a new remembrancer of the deluge.*

MEDUSÆ Caput, or *Medusa's Head*, in *Ancient Mythology*, occurs frequently both on the breast-plates and shield of *Minerva*; in some of which it is the most beautiful, and in others the most shocking object. In some figures the face is represented as dead, but with the most perfect features that can be conceived; in others, her face is full of passion, and her eyes convulsed; and in many others, the look is altogether frightful, and formed on purpose to inspire terror. The beauties and horrors of *Medusa's* face are mentioned by the Roman poets. *Ov. Met. iv. ver. 793.* *Lucan, lib. ix. ver. 680.* *Virg. Æn. viii. ver. 438.* *Spence's Polymetis, p. 61.*

MEDWA, in *Geography*, a town of *Nubia*, on the borders of *Dar-für*; 80 miles N. of *Cobbe*.

MEDWAY, a river peculiarly connected with the county of *Kent*, England, was called by the Britons *Vaga*, a name descriptive of its sinuous course and mazy wanderings. The Saxons changed this appellation to *Medweg* and *Medwege*, from which the present name is a corruption. This river has four principal sources, one in *Kent*, two in *Suffex*, and a fourth in *Surrey*. The latter rises at *Blechingly*, and entering *Kent*, flows on to *Eaton bridge* and *Penhurst*, below which it is joined by one of the branches that rise in *Suffex*, and being augmented by various smaller streams, proceeds

through a beautiful country to *Tunbridge*. A little above this town the river separates into several channels, the northernmost of which is navigable, and is again joined by the other divisions about two miles below *Tunbridge*. Thence proceeding to *Twyford bridge* and *Yalding*, it receives the united waters of the two remaining principal branches; one of which flows from *Waterdown forest* in *Suffex*, and is swelled by the *Bewle* and *Theyse* rivulets; and the other of which rises at *Goldwell*, near *Great Chart*, in *Kent*; this also receives several lesser streams in its progress, and is increased by the waters of the former branch above *Hunton*. From *Yalding*, the *Medway* flows in a winding direction to *Maidstone*, and thence in a wildly devious channel, gradually augmenting in depth and breadth, it pursues its picturesque course to *Rochester*. Proceeding hence towards *Sheerness*, it passes *Chatham*, *Upnor castle*, and *Gillingham fort*; after which it greatly increases in width, and still preserving its meandering character, flows onward to the *Thames*, which it enters between the isles of *Graine* and *Shepey*, having first united its waters to those of the *Swale*. The *Medway* and its numerous tributary streams are calculated to overspread a surface of nearly thirty square miles in the very midst of *Kent*. The tide flows nearly as high as *Maidstone*; but at *Rochester bridge* it is strong and rapid; and below that, all the way to *Sheerness*, a distance of about twenty miles, the bed of the river is so deep, and the reaches so convenient, that many of the largest line of battle ships are moored here, when out of commission, as in a wet dock, and ride as safely as in any harbour of *Great Britain*. In the great storm of 1703, the *Royal Charlotte* was driven on shore here, and lost.

The *Medway* was first made navigable to *Tunbridge* about the middle of the last century, under the provisions of an act of parliament, which passed in the year 1740; though an act had been procured for the purpose in the reign of *Charles II.* By the last act, the undertakers were incorporated by the style of "The Proprietors of the Navigation of the River *Medway*;" and were empowered to raise 30,000*l.* to complete the work, in shares of 100*l.* each. The trade on this river is very great, and includes a vast variety of articles, many of them of the very first necessity, and which, before the navigation was completed, could only be obtained by a circuitous land-carriage. The river is plentifully stored with fish of various species; and was in former times much celebrated for its salmon and sturgeon; the latter, in particular, were so abundant, that a considerable part of the revenues of the bishops of *Rochester* were derived from a duty levied on their sale. They have now in a great measure left the river, but are still occasionally taken of considerable bulk. On the *Medway*, and in the several creeks and waters belonging to it, within the jurisdiction of the corporation of *Rochester*, is an oyster-fishery; and the mayor and citizens hold a court every year, called the *Admiralty court*, for regulating this fishery, and preventing abuses in it. The powers of this court have been established and enforced by two acts of parliament. *Hasted's History and Antiquities of Kent, 12 vols. 8vo.* *Beauties of England and Wales, vol. vii. by E. W. Brayley.* *Ireland's Picturesque Views on the River Medway, 8vo.*

MEDWAY, a post-town of *America*, in *Norfolk county*, *Massachusetts*, bounded E. and S. by *Charles river*, which separates it from *Medfield*; it has two parishes of *Congregationalists*, and contains 1050 inhabitants; 25 miles S.W. of *Boston*.

MEDWAY, or *Midway*, a settlement in *Liberty county*, *Georgia*, formed by emigrants from *Dorchester*, in *South Carolina*, about the year 1780; 30 miles S. of *Savannah*.

MEDWI,

MEDWI, a town of Sweden, in East Gothland, near the Wetter lake, much frequented on account of a celebrated mineral spring.

MEDZIBOZ, a town of Poland, in Volhynia; 20 miles S. of Constantinow.

MEDZIRON, a town of Persia, in the province of Khorasan; 60 miles E. of Meshed.

MEEADAY, or **MEHEDUNG-YAY**. See **CUOCODILE Town**.

MEEKNESS, in *Ethics*, is a virtue which consists in bearing affronts, reproaches, and injuries, with a due composure of mind. Its opposite vice is *revenge*.

MELLAH, in *Geography*, a town of Algiers, in the province of Constantina, supposed to be the Milevum of the ancients, built in the midst of interspersed vallies and mountains, surrounded with gardens, and abundantly supplied with fountains; one of which bubbles up in the centre of the city, and is received into a large square basin of Roman workmanship. Its pomegranates are delicious, and it supplies Constantina with herbs and fruit; its apples are also so good, that the name of the town has been derived from that fruit; 13 miles N.W. of Constantina.

MEËN, **St.**, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Montfort. The place contains 806, and the canton 9905 inhabitants, on a territory of 202½ kilometres, in 9 communes.

MEENAH EL DSAHAN, a sea-port town of Arabia Petraea, situated on the E. coast of the gulf of Accaba, in the N. part of the Red sea, with a spacious harbour, anciently "Ezion-geber;" 50 miles S. of Ailah.

MEENDOR, a town of Hindoostan, in the circar of Condapilly; 18 miles W. of Masulipatam.

MEENEES, a small island in the Sooloo Archipelago. N. lat. 6 32'. E. long. 121 35'.

MEENKOOT, a town of Bengal; 14 miles N. of Moorshedabad.

MEER, **JOHN VANDER**, in *Biography*. There were three painters who bore this name. One was devoted to the study of sea-pieces, but he sometimes painted battles by land, and executed them with very considerable skill. Another was an historical and portrait-painter; but he who best deserves renown, was a disciple of Nicholas Berchem, and succeeded admirably in imitating the style of that master. The subjects he chose were generally rather of a more confined nature than Berchem's, but they are touched with nearly equal clearness and spirit; with more softness and delicacy in their effects. He is known by the name of De Jonghe, or the Young, to distinguish him from the ship-painter, who was called the Old Vander-Meer. De Jonghe died in 1688.

MEER, in *Mining*, a space containing twenty-nine yards in length in any vein.

MEER-flake, is a pin of wood drove into the superficies of the earth, to shew the extent or end of a meer of ground.

MEER-swain, in *Ichthyology*, a name given by some to a sea-fish, more usually known by the name of *caprifiscus*; which see.

MEERBECK, or **MELBECK**, in *Geography*, a town of France, in the department of the Lys, on a small river which runs into the Mandel; eight miles N. of Courtray.

MEERCASERAI, a town of Bengal, in the province of Chittigong; 31 miles N.W. of Islamabad. N. lat. 22° 47'. E. long. 91° 42'.

MEERGUNGE, a town of Bengal; five miles S.E. of Mahmudpour.—Also, a town of Hindoostan, in Benares;

20 miles S.S.W. of Jionpour.—Also, a town of Hindoostan, in Oude; 44 miles E. of Fyzabad.

MEERGUR, a town of Bengal; four miles N. of Dinagepour.

MEERHOLZ, a town of Germany, seated on the Kinzig, giving name to a branch of the house of Ifenburg, called Ifenburg-Meerholz; 17 miles E. of Frankfort on the Main.

MEERJAPOUR, a town of Bengal; six miles S. of Nogong.

MEERJASERRA, a town of Bengal; 25 miles N. of Mauldah.

MEERJEE, or **MEERZAW**, a town of Hindoostan, in Canara, on the coast; 10 miles N. of Onore. N. lat. 14° 28'. E. long. 72° 10'.

MEEROAT, a town of Candahar; 45 miles W. of Ghizni.

MEERPOUR, a town of Bengal; 11 miles S. of Calcutta.

MEERSCHAUM, Werner, *Ecume de Mer*, Broch., and *Keffekil*, Kirwan, in *Mineralogy*, a substance of yellowish-white colour, which occurs in mass, of fine-grained structure, earthy, passing into flat conchoidal, or small flaty, with indeterminate angular, and moderately sharp-edged fragments. This mineral is opaque, soft, easily frangible, acquires a polish by friction, and is unctuous to the touch. Its specific gravity is 1.6. In acids it may be partly dissolved without effervescence, and cannot be fused without addition by the blowpipe. The analyses of Wiegleb and Klaproth give the following results, in which there is a difference, owing to Klaproth's having analysed the fresh earth, and Wiegleb's having examined that which was formed into a tobacco pipe, and consequently baked, and deprived of its water and carbonic acid.

	Wiegleb.	Klaproth.
Silex	54.16	50.5 41
Magnesia	51.66	17.25 18.25
Lime	-	0.5 0.5
Water	-	25. } 39.0
Carbonic acid	-	5. }
	105.82	98.25 98.75

For the uses to which this substance is applied among the Turks, see **KEFFEKIL**. This latter name is derived from Kassa, a town of the Crimea, where it is shipped for Constantinople. It is also found in Natolia, and in the islands of Samos and Negropont. When dug from its thin beds, it is soft, and hardens by being exposed to the air.

A similar substance has been discovered by Fabbroni at Castell del Piano, near Sienna. This consists of 55 parts of silex, 25 of magnesia, 12 of alumine, 3 of lime, and 0.1 of oxyd of iron: and has been formed into bricks which float in the water. This manufacture revives one of the lost arts recorded by Strabo and Pliny.

MEERSEN, in *Geography*, a town of France, in the department of the Lower Meuse, and chief place of a canton, in the district of Maeltricht. The place contains 1149, and the canton 11,530 inhabitants, on a territory of 115 kilometres, in 16 communes.

MEERTA, a town of Hindoostan, in the Subah of Agimere; 42 miles W. of Agimere. N. lat. 26° 23'. E. long. 74° 32'.

MEËS, **LES**, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of

of Digne; 12 miles S.W. of Digne. The place contains 2021, and the canton 6305 inhabitants, on a territory of 57½ kilometres, in 8 communes.

MEESIA, in *Botany*, a genus of Mosses, established by Hedwig, *Fund. v. 2. 97. t. 9. f. 56, 57*, and named by him in memory of David Meese, author of the *Flora Frisica*, an 8vo. of 87 pages, with two plates, published in 1760. This botanist has also published an arrangement of plants, in Latin and Dutch, founded on their cotyledons and mode of germination; and a work on the Syngeneious class of Linnaeus. Hedwig celebrates him as having first seen the stamens of the *Polytrichum*, and as being the first person who ever raised that moss from seed. *Meesia* differs from the *Bryum* of Hedwig, solely in the shortness and bluntness of the teeth of its external fringe, which are not half so long as the inner one. The author indeed, in his original species, found an auxiliary character in the reticulated structure of this inner fringe; but this differs only in degree, and that very slightly, from what is observable in every *Bryum*, nor is it found in the other *Meesia*. Three species are all that have been referred to this supposed genus, in the latest work of Hedwig, his *Species Muscorum*; and these have been reduced by the author of the *Flora Britannica* and others to *Bryum*. They are

1. *M. longifeta*. Hedw. *Crypt. v. 1. 56. t. 21, 22.* (*Bryum triquetrum*; *Turn. Musc. Hib. 115. Engl. Bot. t. 2394.* *Mnium triquetrum*; *Linn. Sp. Pl. 1578*, excluding the synonyms.)—Stem subdivided. Branches simple, erect. Leaves spreading in three rows, ovato-lanceolate, sharp-pointed, finely serrated. Capsule slender pear-shaped, oblique and incurved. Lid conical.—This fine moss, distinguished from all others by the length of its *fruit-stalks*, which extends to three or four inches, is found in bogs in Sweden, Switzerland, and, since the publication of *Fl. Brit.*, in Ireland. Hedwig erroneously describes the *leaves* as entire, notwithstanding the elaborate detail of the two folio plates which he has devoted to this species.

2. *M. uliginosa*. Hedw. *Crypt. v. 1. t. 1, 2.* (*Bryum trichodes*; *Sm. Fl. Brit. 1350. Engl. Bot. t. 1517.*)—Native of bogs in Germany and Scotland. Hedwig says it is common on alpine calcareous rocks in Austria.

3. *M. dealbata*. Hedw. *Sp. Musc. 174. t. 41. f. 6—9.* (*Bryum dealbatum*; *Sm. Fl. Brit. 1350. Engl. Bot. t. 1571.*)—Native of Sweden and Scotland; as well as of St. Faith's bogs, near Norwich. The *leaves* are of a singularly whitish green, finely reticulated.

These two last species are described by the late Mr. Wood, in our article *BRYUM*, n. 4 and 5. The first was omitted there, not being known at that time as a British plant.

MEETKA, in *Geography*, a country of Africa, W. of Bergoo.

MEFLESS, a town of Bohemia, in the circle of Königgratz; 14 miles N.E. of Königgratz.

MEGADOMESTICUS. See *DOMESTIC*.

MEGÆRA, in *Mythology*, one of the three furies. She is represented with serpents on her head, and two distinguished ones over her forehead, as her sisters have, and, like them, with torches. She is not mentioned so frequently by the Roman poets as the others are. Virgil gives us a descriptive picture of her, where he is speaking of the punishment of the Lapithæ; who were said to be always placed round a table very richly and plentifully set out, with a loose piece of rock hanging over their heads, as just ready to fall; and this fury attending close by, to watch and menace them, the moment they endeavoured to taste any one of the tempting things set before them. *Æn. vi. ver. 607.*

MEGAIZEL, in *Geography*, a town of Egypt; six miles N. of Rosetta.

MEGALA, a town of Tunis; 3 miles N.E. of Spaitla.

MEGALARTIA, Μεγαλαρτία, in *Antiquity*, a festival in honour of Ceres, being the same with Thesmophoria.

MEGALASCLEPIA, Μεγαλασκληπεία, a festival in honour of Æsculapius. See *ASCLEPIA*.

MAGALENSIA, or **MEGALESIA**, solemn feasts celebrated among the Romans on the twelfth of April, in honour of the great mother of the gods, that is, Cybele or Rhea: wherein were sports or combats held before the temple of that goddess.

They were called *megalensia*, from the Greek *μεγαλη*, great, Cybele being accounted the great goddess.

MEGALONISI, in *Geography*, a small island in the Mediterranean, near the coast of the Morea; two miles E. of Leucadia.

MEGALOPOLIS, in *Ancient Geography*, now *Leontari*, a large city, as its name imports, in the southern part of Arcadia, upon the river Helisson. Pausanias observes, that it was the most modern of the cities of Arcadia, if we except those which had been renewed by Roman colonies, after the victory of Octavius over Antony. It owed its foundation to the counsels and activity of Epaminondas, who in the year 365 B.C., being desirous of keeping the Lacedæmonians in that state of subjection to which they were reduced, induced the Arcadians to establish this city, and to settle in it a numerous colony, collected from different cities, so that it might serve as a fortress and a bulwark against Sparta. To favour them in this enterprise, and to protect them in their labours, he sent them a guard of a thousand chosen men, under the command of Pammenes. The city being thus fortified and defended, the Arcadians confided in its strength and security; and on the other hand their enemies were the more desirous of attacking it. To this object they directed their whole force; but the Megalopolitans for a long time vigorously resisted them. At length, however, *viz.* in the year 224 or 225 B.C. it fell, partly by surprize, and partly by a violation of treaties, under the power of Cleomenes, king of Sparta. The greater number of the inhabitants retired to Messenia, and emboldened by the counsels and example of Philopœmen, they refused the offer made them by Cleomenes, of remaining in their own city, on condition of concurring in the Achæan league. Philopœmen, upon their return to Arcadia, encouraged them to rebuild their city, and to adorn it with temples and magnificent edifices, which restored its former splendour. It is needless to enumerate its temples and statues, and other ornaments. The most considerable monument which the southern part of Megalopolis presented, was the theatre, a building so grand and magnificent, that it even exceeded in extent and beauty all those of Greece. We learn from Polybius that, next to Athens, Megalopolis was the grandest and most splendid city of Greece.

MEGAMETER. See *MICROMETER*.

MEGARA, in *Ancient Geography*, the capital of the territory of the Megarians, which has been commonly comprised in Attica, bounded eastward by mountains, and extends westward as far as a district of the isthmus of Corinth. Megara, which had previously been called Nisa, derived its name either from Megarius, the surname of Minos, a Bœotian chief, who succeeded the king of Nisa, or from Megara, the name given to ancient temples erected in honour of Ceres, or from Megara, a supposed wife of Hercules. Under the reign of Codrus, the Peloponnesians having declared

clared war against the Athenians, and miscarried in their enterprise, returned and took possession of Megara, which they peopled with Corinthians. Besides two citadels, this city had several magnificent structures and ornaments; one was an aqueduct, distinguished by the grandeur and beauty of its columns, constructed by Theagenes, tyrant of Megara; another was a statue of Diana, the protectress; to which we may add, the statues of the twelve great gods, attributed to Praxiteles; a group consecrated to Jupiter Olympius, in which was a statue of this deity, with the face of gold and ivory, and the rest of the body of burnt earth; and upon the path that led to one of the citadels of Megara, called Caria, were a temple of Bacchus Nyctalus, another of Venus Spiltrophia, a chapel dedicated to the Night, whence issued her oracles; a temple of Jupiter; two statues, one of Æsculapius, and one of Hygeia, executed by Briexis, and a temple of Ceres, called the Megaron; north of the citadel, near the temple of Jupiter the Olympian, was the tomb of Alcmenes, and that of Hyllus, son of Hercules; a temple of Apollo and Diana, the tomb of Hippolyta, queen of the Amazons, and the tomb of Theraea. Besides these edifices, there were in the second citadel, called the citadel of Aleathous, a tomb of Megareus, and a temple of Minerva, with her statue, the body of which was gilt, and the face, feet, and hands were of ivory, &c. &c. See Pausanias in Attica, c. 39—44.

MEGARA was also the name of a town on the eastern coast of Sicily, on the gulf of Megara, otherwise called Xiphonius, N. of Syracuse. This city, which is said to have been built here by the Greeks of Megara, the city of Achaia, (see the preceding article,) gave name to the mountain, called "Hybla Megara." This colony, 100 years after its establishment, founded Salinus, which was destroyed by Marcellus when he besieged Syracuse. The ruins of Megara are now scarcely discernible.

MEGARA, a town of Illyria.—Also, a town of Pontus.—Also, a town of Asia, in Syria, dependent upon Apamea.—And also, a town of Greece, in the Peloponnesus.

MEGARA, in *Geography*, a town of European Turkey, in the province of Livadia, on the coast of the gulf of Engia, once the capital of a republic, now very much reduced; 26 miles W. of Athens.

MEGARBE, a town of Nubia; 9 miles W.S.W. of Mafuah.

MEGARIS, or the MEGARIDE, in *Ancient Geography*, a country of Attica. See MEGARA *supra*.

MEGARIS, a town of Italy, in Campania, placed by Pliny between Naples and Paulilipo.

MEGATHERIUM, in *Natural History*, a genus of the class Mammalia, order Bruta. This is generally known by the name of *mammoth*. It has a near resemblance to the elephant, but its having never been found alive, nor with its organs in a perfect state after death, its generic character cannot be accurately ascertained. By some accounts from St. Petersburg, it is supposed that the animal still exists in a living state, though it has hitherto escaped the researches of modern naturalists. Its residence appears to have been confined to a line in the northern hemisphere, extending from Siberia to the banks of the Ohio, and the common name of mammoth was first given to the skeleton when dug from the earth by a Siberian peasant. The following is the best account we have of this animal: it was received from St. Petersburg, and relates to a specimen found, though not alive, yet in a complete and almost perfect state of preservation. A Tungoose chief, in the summer of 1799, when the fishing in the river Lena was over, repaired, according to annual custom, to the sea-side. Leaving his family in their huts, he

coasted along the shore in quest of the tusks of the mammoth, when he accidentally perceived, in the midst of a rock of ice, a large shapeless block, not at all resembling the logs of drift wood commonly found there. He climbed the rock, and examined it all round, but could not ascertain what it was. The next year he returned, and found the carcass of a *teribeus rosmarus*, and observed that the mass which he had seen before was freer from ice, but that there were two similar pieces by the side of it. These proved to be the feet of the mammoth. In 1811, the side of the animal and one of its tusks appearing very distinctly, he acquainted his wife and some of his friends with what he had found. An alarm was instantly spread: the aged people affirmed that a similar monster had been seen once before, and that the whole family of the person who discovered it soon became extinct. At first the chief, terrified at the report, abandoned his prize, fell sick, and was brought nearly to the grave; but on his recovery, he was more resolute, and was determined not to relinquish the expectation of the profit he might make of the tusks. It was not, however, till the fifth year, that the ice had melted sufficiently to disengage the mammoth, when it fell over on its side on a bank of sand. The Tungoose was quite satisfied to take away the tusks, which he bartered for goods to the value of 50 rubles, or rather more than 11*l*. Being satisfied with the prize, the carcass was left to be devoured by the bears, wolves, and foxes. Previously to this he had made a rude drawing of it, which represented it as having pointed ears, small eyes, horse's hoofs, and a bristly mane extending along the whole back. In 1806, Mr. Michael Adams, of Petersburg, being at Yakoutsk, heard of the circumstance, and proceeded to the spot, in order to investigate every thing relating to it. Before his arrival, the skeleton was stripped of its flesh, but was itself entire, with the exception of one fore-foot. The vertebræ, one of the shoulder-blades, the pelvis, and the remaining three extremities, were held firmly together by the ligaments of the joints, and by strips of skin and flesh. It received some damage in the removal to Peterburg, a distance of almost 7000 miles. The ears, however, were preserved, and the pupil of the left eye was perfectly distinguishable. From other parts it proved to be a male, with a long mane, but had neither tail nor trunk. From the structure of the os coccygis, Mr. Adams did not entertain a doubt that it had a short thick tail, and he thinks it must have had a proboscis. The skin was of a deepish grey colour, and covered with reddish hair and black bristles. The head weighed 460lb.; the two horns weigh 400lb.: the entire animal was 10½ feet high, and full sixteen feet long. Mr. Adams has seen the tusks, and says they are so curved as to form three-fourths of a circle. They are curved in the direction opposite to those of the elephant, bending towards the body of the animal. In 1801, Mr. William Peale, proprietor of the museum at Philadelphia, succeeded in obtaining a skeleton so nearly complete, that, by a few additions only, he rendered it, as it were, perfect. This skeleton was brought to London, and exhibited eight or nine years ago.

The generic name of *Megatherium* was first given to it by M. Cuvier, who has accurately examined the skeleton; and to the generic name he added the trivial one of *Americanum*. In Dr. Shaw's *Zoology* it is described as a species of the *Manis* genus, and is denominated *Manis megatherium*. According to Cuvier, the skeleton which he saw at Madrid was twelve feet long, and about six in height. The spine is composed of seven vertical, sixteen dorsal, and four lumbar vertebræ. It has sixteen ribs; the sacrum is short, the ossa ilia very broad. The thigh-bones are excessively thick, and the leg-bones still more so in proportion. The entire sole of
the

the foot bore on the ground in the act of walking. The shoulder-blade is much broader than long: the fore-limbs are longer than the hind. The head is the greatest singularity of the skeleton. The occiput is elongated and flattened, but is convex above the eyes. The two jaws form a considerable projection, but without cutting teeth, all grinders, with a flat crown, and grooved acrofs.

This quadruped, in its character, differs from all known animals: and each of its bones, considered apart, also differs from the corresponding bones of all known animals. This results from a comparison of the skeleton with that of other animals, for none of the animals which approach it in bulk, have either pointed claws, or a similarly formed head, shoulder-blades, clavicle, pelvis, or limbs. "As to its place in the system of quadrupeds," says the French naturalist, "it is perfectly marked by the sole inspection of the ordinary indicatory characters, that is, the claws and teeth. These shew that it must be classed in the family of unguiculated quadrupeds, destitute of cutting teeth, and in fact it has striking relations with those animals in all parts of its body. This family is composed of the *dasybus*, *bradypus*, *manis*, *myrmecophagus*, and Cape ant-eater, or *orycteropus*. The thickness of the branches of the lower jaw, surpassing even that of the elephant, seems to prove that this vast animal was not content with leaves, but, like the elephant and rhinoceros, broke on the ground the branches themselves; its close and flat-crowned teeth appearing very proper for that purpose." Cuvier thinks there are indications that this animal had a trunk, but that it must have been short, since the length of the head and neck together only equals that of the fore-legs. He places it between the *bradypus* and the *dasybus* genera, because to the shape of the head of the former it joins the teeth of the latter. It would be necessary to know particulars, of which a skeleton cannot inform us, in order to determine to which of these it approached the most. "This adds," says Cuvier, "to the numerous facts which apprise us that the animals of the ancient world were all different from those we now see on the earth, for it is scarcely probable that if this animal still existed, so remarkable a species would have hitherto escaped the researches of naturalists. It is also a new and very strong proof of the invincible laws of the subordination of characters, and the justness of the consequences deduced for the classification of organized bodies: and under both these views, it is one of the most valuable discoveries which have for a long time been made in natural history."

MEGE, in *Geography*, a town of Persia, in Faristan; 10 miles S. of Isfahan.

MEGEVE, a town of France, in the department of the Leman, and chief place of a canton, in the district of Boverville. The place contains 3075, and the canton 9951 inhabitants, on a territory of 180 kilometres, in seven communes.

MEGGIO, a town of Africa, in Fez; nine miles from the Mediterranean.

MEGHARISH UZZUR, or ACRA, a town of Arabia, in the province of Hedsjas; 85 miles E.S.E. of Madian.

MEGHEM, or MEGEN, a town of Brabant, on the Meuse; 12 miles S. of Nimeguen.

MEGNITZESC, a town of Sclavonia; 18 miles W.S.W. of Verovitz.

MEGRA, a town of Russia, in the government of Archangel, on the E. coast of the White sea; 72 miles N. of Archangel.

MEGUNTICK, a lake of Canada, on the borders of Maine. N. lat. 45° 44'. W. long. 70° 25'.

MEHALLE' EL KEBIRÉ, a town of Egypt, capital of

Garbia, the second province of the Delta, and the residence of a bey. As there is no town more considerable in the Delta, it is called Kebira the Great. It has manufactories of linen and some sal ammoniac works. A great deal of business is done there. The rivers which surround it serve for the conveyance of its merchandize through Egypt. Its environs are covered with villages, flocks, and the various productions of a fertile soil; 47 miles N. of Cairo. N. lat. 30° 50'. E. long. 31° 24'.

MEHALLEBEG, a town of Persia, in the province of Irak; 25 miles S.E. of Rai.

MEHALLET EL EMIR, a town of Egypt, on the Nile; six miles S.E. of Rosetta. N. lat. 30° 50'. E. long. 30° 24'.

MEHALLET *il Loben*, a town of Egypt; 16 miles S. of Faoué.

MEHALLET *Malek*, a town of Egypt; five miles S. of Faoué.

MEHALLET *il Meshak*, a town of Egypt; five miles N.N.E. of Tineh.

MEHAMA, one of the smaller Friendly islands, in the Pacific ocean; four miles E. of Neeneeva.

MEHEGAN, WILLIAM ALEXANDER, in *Biography*, was born at la Salle, in the Cevennes, in the year 1721, of a family originally from Ireland, which had followed the fortunes of James II. He was prevented from adopting the profession of arms, in which his family had been distinguished, by ill health, and cultivated the belles lettres, attaching himself particularly to the study of eloquence. When Frederic V. king of Denmark founded, in the year 1751, a professorship of the French language, M. de Mèhègan composed a discourse which was pronounced at the opening of the lectures in Copenhagen. In the following year he published a work entitled "L'Origine des Guebres; ou la Religion naturelle mise en Action," which was looked upon as breathing the spirit of modern philosophy. This was followed at distant intervals by "Considerations sur les Révolutions des Arts;" "Pièces fugitives;" "Mémoires de la Marquise de Terville;" "Lettres d'Aspasie;" and in 1759 "L'Origine, le Progrès, et la Décadence de l'Idolatrie." He died in 1766, and after that event, was published; as a posthumous work of M. Mèhègan, "Tableau de l'Histoire moderne," in three vols. 12mo. This is highly esteemed on account of the warmth and eloquence of the style, and the generally impartial and philosophical spirit by which it is animated. The history commences with the year 476, and concludes with the peace of Westphalia in 1648. "It is," says his biographer, "full of picture and portrait, upon which he sometimes throws too strong a glare of colouring; he has, however, succeeded in making his work much more interesting than abridgments usually are, and at the same time has judiciously selected the points of instruction." There is an English translation of it. In 1767 was published another posthumous work of this author, entitled "L'Histoire considérée vis-à-vis la Religion, les Beaux-Arts, et l'Etat," in three volumes 12mo. Gen. Biog.

MEHEM, in *Geography*, a town of Hindoostan, in the subah of Delhi; 27 miles W S.W. of Rodak.

MEHERRIN, a town of America, in North Carolina; 25 miles E. of Halifax.—Also, a river of Virginia, which runs into the Chouan, 20 miles N.W. of Hartford, in N. Carolina.

MEHINDEY, a river of Hindoostan, which runs into the gulf of Caubay, about 40 miles S. of Amedabad.

MEHITPOUR, a town of Hindoostan, in Labore; 45 miles S.E. of Sultanpour.

MEHRIBAN, a town of Curdistan; 22 miles S.E. of Sherezur.

MEHUN, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges, situated on the Eure; seven miles N.W. of Bourges. The place contains 1267, and the canton 7064 inhabitants, on a territory of 287½ kilometres, in 12 communes. Charles VII. had a palace in this town, where he resided, and starved himself to death for fear of being poisoned by his son Louis XI. N. lat. 47° 9'. E. long. 2° 18'.

MEHON, a small island in the straits of Babelmandeb. N. lat. 12° 20'.

MEHUNTPOUR, a town of Hindoostan, in the circar of Chanderee; 16 miles N.W. of Chanderee.

MEI, GIROLAMO, in *Biography*, a Florentine nobleman, mathematician, philosopher, and theoretical musician, who flourished in the latter end of the sixteenth century. Battista Doni, in his "Trattato secondo sopra gl'Instrumenti di Tali," or keyed instruments, says, that in the beginning of his musical studies, his partiality for the music of the ancients was greatly increased by the perusal of the dialogue of Galilei, in which Mei had the greater part (dove il Mei ebbe la maggior parte), and still more by a treatise written by this learned personage (Mei) "De Modis Musicæ," a MS. presented to the Vatican library by Monsig. Guaengo. Op. Om. t. i. p. 324. Doni has supported this assertion by no proof; but in the Vatican library, among the queen of Sweden's MSS. there is a volume of inedited tracts and letters, written by Girolamo Mei, upon the music of the ancients, in which are discoverable, not only opinions similar to those of Galilei, but frequently the words in which they are expressed in his dialogue; particularly in a letter from Mei, dated Rome, 1572, in answer to two that he had received from Galilei, in which he seems to have been consulted concerning the usual difficulties which those have to encounter who undertake to discuss the music of the ancients. We procured a copy of this letter entire, and considerable extracts from the other writings of Mei, which indeed contain the whole substance of Galilei's dialogue, except what concerns the controversy with Zarlino relative to the musical scales and proportions of the ancients.

MEI *Misere*. See MISERERE.

MEIA SAREKIN, in *Geography*, a town of Asiatic Turkey, in the government of Diarbekir; 30 miles E.N.E. of Diarbekir. N. lat. 38° 5'. E. long. 39° 55'.

MEIANE, a town of Persia, in the province of Comis; 18 miles S.S.E. of Bistan.

MEIANO, a town of Italy, in the department of the Mela; 12 miles S.S.W. of Brescia.

MEIAS-FAREKIN, a town of Asiatic Turkey, in the province of Diarbekir; 25 miles N.E. of Diarbekir.

MEIBOMIA, in *Botany*, a genus of Heister's, named after Brandanus Meibom, professor of medicine at Helmstadt, who died in 1740, aged 62, but who is not recorded as having written any botanical work. The plant on which Heister founded his genus is *Hedysarum canadense* of Linnæus. We do not find that he has given any other character, than enumerating it among papilionaceous genera with ternate leaves; see Heist. syst. 9.

There was another professor Meibom at Helmstadt, who wrote upon beer, *de cerevisiis potibusque et ebriaminibus extra vinum alius commentarius*, and died in 1655, aged 65. Dryandr. Bibl. Banks.

MEIBOMIAN GLANDS, in *Anatomy*, very small round bodies, arranged in parallel vertical lines on the inner surface of the tarsus of the eyelids, and secreting an unctuous substance, which is poured from their ducts on the ciliary edges

of the palpebræ, and prevents their agglutination. See EYE.

MEIBOMIUS, JOHN HENRY, in *Biography*, a learned physician, was born at Helmstadt, in August 1590. He spent a considerable time on his travels in Italy, for the purposes of improvement in science and literature; and, having given his attention to medicine, in which he made great progress, he went ultimately to Basle, in 1619, where he was honoured with the degree of doctor of physic. On his return to his native place, his character obtained for him, in 1620, the appointment of professor of medicine from the faculty of that university; and he continued in the office about six years, when he removed to Lubeck, where he had been chosen physician to the city, and to its bishop. Here he passed the rest of his life, which terminated in May 1655, in his sixty-fifth year. In the latter period of his life, he employed himself chiefly in the investigation of medical history, and left a manuscript to his son, entitled "De Vitis Medicorum usque ad seculum xv;" but this work was never printed. The following are the whole of his published works, the two last of which appeared after his death. 1. "Hippocratis Orkos, sive Commentarius in Hippocratis jusjurandum," Lugd. Bat. 1643, 4to. 2. "De Flagrorum usu in re venera," *ibid.* 1643, which was reprinted at London, Copenhagen, and Francfort. 3. "Epistola de Cynophoria, seu, Canis portatione ignominiosa," Helmstadt, 1645. 4. "De Mithridatio et Theriaca Discursus," Lubeck, 1652, 1659. 5. "Mæcenas, sive, de C. D. Mæcenatis vitâ, moribus, et gestis, Liber singularis," Lug. Bat. 1653. 6. "De Cerevisiis, Potibusque et Ebriaminibus extra Vinum alius, Commentarius," Helmstadt, 1668, published together with the treatise of Adrian Turnebus, "De Vino;" and 7. "Aurelii Cassiodori Formula Comitum Archiatrorum," *ibid.* 1668; which is a commentary on the 10th epistle of the 6th book of Cassiodorus. Eloy Dict. Hist.

MEIBOMIUS, HENRY, son of the preceding, was born at Lubeck, in June 1638. After having gone through various courses of study at Helmstadt, and in different Dutch universities, he travelled into Italy and France, and took his doctor's degree at Angers, in 1663. He then continued his travels into England, whence he returned to Germany. His father's name was still held in estimation at Helmstadt, and his own talents and acquirements gained him considerable respect, so that he was soon enrolled among the professors of that university; in which he held successively the chairs of medicine, poetry, and history; the last of which he retained at the time of his death, in March 1700, when he had reached his sixty-second year. Occupied as he ever was in the practice of his profession, and in his academical labours, he nevertheless found leisure to write several works, and also to superintend the publication of the writings of others. His first dissertation, "De Incubatione in Fanis Deorum, Medicinæ causâ, olim factâ," was published at Helmstadt, in 1659. It contained a history of the priest-medicine of ancient times, and of the various ceremonies, offerings, and sacrifices, instituted in different Pagan temples, in conducting this practice. He edited a treatise of Arnold de Boot, which had been published in London, in 1649, entitled "Observationes Medicæ de Affectibus omiffis;" with a preface, and many valuable notes, *ibid.* 1664. He also published "De Vasis Palpebrarum novis, Epistola ad Joëlem Lange-lottum," *ibid.* 1666. "De Ossium contusione Disputatio," *ibid.* 1668; and several other small dissertations, which evinced his great knowledge of the animal economy, and its disorders. He seems to have contemplated a history of medicine, and printed, "De Medicorum Historiâ scribendâ, Epistola ad G. H. Velschium," *ibid.* 1669; but the diffi-

culties which he met with in investigating the medicine of the Arabians arrested his progress, and deterred him from publishing the work left him by his father. He published, however, the following: "Parentatio I. Danielis Schmidt," Dantisci, 1687. "Ad Saxonice Inferioris Historiam Introductio," Helmstadt, 1687. "Scriptores Rerum Germanicarum," *ibid.* 1688, in two vols. folio; and he edited Valentin. Hen. Vogler's "Introductio universalis in notitiam cujuscumque generis bonorum scriptorum," *ibid.* 1700, with additions.

Some other individuals of the family of MEIBOMIUS were professors at Helmstadt; especially *Henry*, the grandfather of the preceding Henry, who published several works; *Mark*, whose studies were entirely confined to history and the belles-lettres; and *Brandus*, who taught medicine, and published several academical dissertations, about 1730. Eloy Dist. Hist. de Med.

MEIBOMIUS, MARCUS, a writer of great erudition, particularly in the music of the ancient Greeks, was descended from a very learned family at Helmstadt, who successively practised physic in that city, with great reputation.

Marcus Meibomius was born about 1611, and in 1652 he published from the Elzevir press, in two volumes 4to. dedicated to Christina, queen of Sweden, the following work: "Antiquæ Musicæ auctores septem Græce et Latine, Marcus Meibomius restituit ac Notis explicavit. Amstel. apud Lud. Elzivirium, cl. lx. lii." The first volume contains:

- I. Aristoxeni Harmonicorum Elementorum, libri iii.
- II. Euclidis Introductio Harmonica.
- III. Nichomachi Geraseni, Pythagorici, Harmonius Manuale.
- IV. Alypii Introductio Musica.
- V. Gaudentii, Philosophi Introductio Harmonica.
- VI. Bacchii Senioris Introductio Artis Musicæ.

The second volume.

- Aristidis Quintiliani de Musica, libri iii.
Martiani Capellæ de Musica, liber ix.

Meibomius, after this learned and elegant publication, was invited to the court of the queen of Sweden, which invitation he accepted.

Having, by his enthusiastic account of the music of the ancients, impressed this princess with similar ideas, the younger Bourdelot, a physician, and his rival (as a classical scholar) in the queen's favour, instigated her majesty to desire him to sing an ancient Grecian air, while Naudet, an old Frenchman, danced *à la Grec* to the sound of his voice. But the performance, instead of exciting admiration, produced loud bursts of laughter from all present; which so enraged Meibomius, that seeing the buffoon Bourdelot in the gallery among the scoffers, and having no doubt but that it was he who, with a malicious design, had persuaded her majesty to desire this performance, immediately flew thither, and exercised the pugilist's art on his face so violently, without being restrained by the presence of the queen, that he thought it necessary to quit the Swedish dominions before he could be called to an account for his rashness; and immediately went to Copenhagen, where, being well received, he fixed his residence there, and became a professor at Sora, a Danish college for the instruction of the young nobility; here too he was honoured with the title of aulic counsellor, and soon after was called to Elfsneur, and advanced to the dignity of Architectorié, or president of the board of maritime taxes or customs; but neglecting the duty of his office, he was dismissed, and upon that disgrace quitted Denmark.

Soon after he settled at Amsterdam, and became professor of history in the college of that city; but refusing to give

instructions to the son of a burgomaster, alleging that he was not accustomed to instruct boys in the elements of knowledge, but to finish students arrived at maturity in their studies; he was dismissed from that station.

After quitting Amsterdam, he visited France and England; then returning to Holland, he led a studious and private life at Amsterdam till 1710 or 1711, when he died at near 90 years of age.

Besides the seven Greek writers on ancient music, Meibomius published an edition of the Greek mythologists; a treatise de Fabrica Triremium; a new edition of Vitruvius, with a commentary on the *Echeia*, or harmonic vases, described book 5; correcting, for a new edition, the Hebrew bible. This daring work appeared at Amsterdam, 1698, in folio, under the title "Davidis Psalmi, et totidem sacræ scripturæ veteris Testamenti capita—restituta, &c."

The most solid and celebrated of his critical works is his edition of the seven Greek writers on ancient music, in which all subsequent writers on the subject of ancient music place implicit faith. It is from the indefatigable and learned labours of Meibomius, in his commentaries on the Greek writers in music, particularly Alypius, that we are able to fancy we can decipher the musical characters used by the ancient Greeks in their notation; which, before his time, had been so altered, corrupted, disfigured, and confounded, by the ignorance or negligence of the transcribers of ancient MSS., that they were rendered wholly unintelligible.

MEICHE, in *Geography*, a town of France, in the department of the Doubs, and chief place of a canton, in the district of St. Hippolyte. The place contains 690, and the canton 7864 inhabitants, on a territory of 222½ kilometres, in 31 communes.

MEIDAN, a town of Persian Armenia; 100 miles N.E. of Erivan.

MEIDANS, in the *Eastern Nations*, are a sort of country-seats, where the greater people have often summer-houses, to which they retire on the three days of the week in which they do not attend the pasha's divan, and where they divert themselves with seeing their slaves ride, shoot, and throw the dart, while they are regaling with their pipe and coffee.

MEIDOBRYGA, in *Ancient Geography*, a town of Hispania, in Lusitania, S.W. of Nuba Cæsarea. It was formerly a powerful city; and its inhabitants were called Plumbarii, on account of the mines of lead which were found in its vicinity. Some traces of it have been discovered in a place called Armenha. South of this town was a chain of mountains, denominated "Mons Herminius."

MEIDON, or MEIDUN, in *Geography*, a town of Egypt, at some distance from the left bank of the Nile, near which is the most southerly of the pyramids; it is thought to occupy the site of the ancient Nilopolis; 32 miles S. of Cairo.

MEJEDDAH, a town of Algiers, on the Shellif; five miles N.E. of Seedy-Abid.

MEJERDAH, or MAI-SEAR-DA, a sea-port town of Algiers, in the province of Tremecen, consisting of meanly-constructed cottages. From this place a great quantity of corn is exported to Europe; 42 miles W. of Tremecen. N. lat. 35° 8'. W. long. 1° 35'.

MEJERDAH, a river of Africa, formed by the union of the Sujeras and the Serrat, on the borders of Algiers; after traversing the country from W. to E. it runs into the Mediterranean at Porto Farina. It pursues a winding course through a country, which it contributes to fertilize, and in this respect, as well as by its encroachments on the sea, it resembles

resembles the Nile. This river was anciently called "Bagrada," or "Brada." See BAGHADA.

MEILAN, a town of European Turkey, in Natolia; 18 miles W.N.W. of Kiangari.

MEILHAN, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Marmande; six miles W.N.W. of Marmande. The place contains 2,414, and the canton 9,552 inhabitants, on a territory of 170 kilometres, in 10 communes.

MEILHUY, a town of Norway, in the government of Drontheim; 14 miles S.W. of Drontheim.

MEIMARG, a town of Grand Bucharia; 36 miles S.E. of Bokbara; which see.

MEIMEND, a town of Persia, in Segellan; 40 miles W. of Candahar. N. lat. 33° 5'. E. long. 65° 45'.

MEINAM, signifying the "Mother of Waters," a large river of Siam. According to Loubere, this river, when it enters the dominions of Siam, is so small that it can only convey small boats, scarcely sufficient for carrying above four or five persons. It is afterwards very much augmented, at the town of Lancocevan, by another considerable river from the north, of the same name, or rather by the reunion of a branch of the same river. Loubere's account of the smallness of the stream has been doubted, and it has been suggested, that it was only obstructed in its course by rapids or cataracts. When we advert to the regular inundations, similar to those of the Nile and Ganges, which are rivers of long course, and other circumstances, we may infer that the Meinam is of a more distant and higher origin than the mountains of Yunnan in the west of China; and that the Thibetian Alps furnish its source in that of the Nou Kian of the Lamas, supposed to be the Thaluan or river of Martaban, which has no Delta, nor any marks of so distant an origin, but is represented by Loubere and d'Anville as a short and insignificant stream. The Meinam is celebrated among the oriental rivers. Kämpfer says, that it is very deep and rapid, always full, and larger than the Elbe. He adds, that the inhabitants suppose its source to be in the mountains, which give rise to the Ganges, and that it branches through Cambodia and Pegu; an account somewhat confirmed by the discovery of the river Anau, which connects the Meinam with the rivers of Cambodia. The inundations are in September, after the snows have melted in the northern mountains, and the rainy season has commenced. In December the waters decline, and by degrees sink to their former level. The same intelligent traveller informs us, that the water in the earth swells before the river rises; that the wells are nitrous, but the water of the Meinam, though muddy, is pleasant and salutary; that the inundations are chiefly discernible towards the centre of the kingdom, not near the sea; that the rice is reaped in boats, and the straw left in the water; that a festival is celebrated in December, when the wind begins to blow from the north, and the inundation abates. The banks of the Meinam are generally low and marshy, but thickly peopled from Yuthia to Bangkok, below which are wild deserts like the Sunderbunde of the Ganges. Monkeys, fire-flies, and moskitoes swarm on the fertile shores. Pinkerton.

MEINART, a town of Germany, in the county of Hohenlohe; 7 miles S.E. of Ohringen.

MEINAU, an island in the N.W. part of the lake of Constance, with a commandery of the Teutonic order; about three miles in circumference. In 1805 it was added to Baden, once so celebrated for its wine; 14 miles N. of Constance.

MEINOR. See MAINOUR.

MEINUNGEN, in *Geography*, a town of Germany,

in the county of Henneberg, belonging to the prince of Saxe-Weimar, situated amidst mountains, on the river Werra; 21 miles N. of Schweinfurt. N. lat. 50° 37'. E. long. 10° 40'.

MEIONITE; *Hyacinthe blanche de Somma*, Romé de Pisse; *Hyacinthine*, Delameth.

The colour of this mineral is a greyish-white.

It occurs seldom massive; generally in prismatic crystals, the primitive form of which is a rectangular prism with square bases. The principal modifications are

The rectangular four-sided prism, acuminate by four planes placed on the lateral edges.

The preceding with lateral edges truncated (*diottaedre*, Haüy, fig. 76.) The truncating planes are often seen on two opposite edges only.

The same, but with lateral edges bevelled, and the bevelment again truncated; the edges formed by the lateral and acuminate planes likewise replaced by a plane, (*soustradis*, Haüy, fig. 77.)

Often one of the acuminate planes increases at the expense of the others which sometimes entirely disappear.

The crystals are small, seldom middle-sized, closely grouped together. They are splendid, with a vitreous lustre, especially when viewed in the direction of the longitudinal fracture.

Longitudinal fracture foliated, the folia parallel with the four sides of the prism; cross fracture conchoidal: the former is indicated by fissures observable in the interior.

It is semi-transparent passing into transparent.

It is hard, scratching glass.

Before the blowpipe it effervesces, and easily melts into a spongy white glass.

We are still without an analysis of this substance.

Meionite is found at Capo di Bove, near Rome, in basalt with melilite, augite, leucite; and on Monte Somma, among the volcanic ejections of Vesuvius, with calcareous spar or granular limestone.

This mineral substance was first discovered by Romé de l'Isle, who considered it as a variety of Vesuvian; Haüy afterwards found it to be a distinct species, to which he gave the name it now bears, and which has been also adopted by Werner, who at first considered it as a variety of feldspar.

From mesotype-zeolite, with which it might be confounded at first view, the meionite differs in not forming a jelly with nitric acid.

MEIOSIS, in *Rhetoric*, is a figure, which is a species of the hyperbole.

MEIRONNES, in *Geography*, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Barcelonnette. The place contains 554, and the canton 3,252 inhabitants, on a territory of 335 kilometres, in three communes.

MEISENHEIM, a town of France, in the department of the Sarre, and chief place of a canton, in the district of Birkenfeld. The place contains 1,730, and the canton 7,512 inhabitants, in 21 communes.

MEISNER, BALTHASAR, in *Biography*, an eminent German Lutheran divine, was born in Saxony in the year 1587. At the age of fifteen he was sent to pursue his academical studies at the university of Wittemberg, where he took his degree of M.A., and acquired much reputation by his diligence and talents. He studied also at the universities of Strasburg, Tubingen, and Giessen; but in 1611 he returned to Wittemberg, and was appointed professor of moral philosophy, and in 1614 he was elected to the theological chair, which he filled with great success during the remainder

of his life. He died in 1626, leaving behind him works that bear witness to his learning and zeal, of which we may notice "Commentarius in Hoseam;" "Meditationes Sacræ in Evangelia;" "Anthropologia Sacra," in two vols. quarto, and "Philosophia Sobria, hoc est, confideratio Questionum Philosophicarum," in three vols. quarto.

MEISSANG, in *Geography*, a town of Africa, in Kaarta; 52 miles E. of Kemmoo.

MEISSAU, a town of Austria; 34 miles N.W. of Vienna.

MEISSEN, *Margraviate of*, a principality of Saxony, founded in the 10th century, and united in 1422 to the electorate of Saxony. Its boundaries have been various at different periods.

MEISSA, a city of Saxony, capital of the margraviate above-mentioned, situated on the Elbe, at its confluence with the Meisse, whence its name. Out of several jurisdictions that formerly belonged to this town arose the four prefectures of Meissen, to which pertain several villages. In the centre of the old citadel, the other parts of which are in a ruined state, is the part called "Albretschsburg," in which is carried on the celebrated manufacture of the excellent Misnian porcelain. At this place is also a manufacture of cloth. The first foundation of this town was begun by king Henry I. about the year 930; 14 miles N.W. of Dresden. N. lat. 51° 19'. E. long. 13° 27'.

MEKAM ALI, a town of the Arabian Irak, on the Euphrates, opposite to Bassora.

MEKAM ul Kidr, a town of the Arabian Irak, on the Euphrates; 26 miles S.S.E. of Hellah.

MEKARA, a name of the Hindoo goddesses *Parvati*, which see.

MEKEHOAN, in *Geography*, a town of Arabia, in the province of Oman, on the Persian gulf; 45 miles W.S.W. of Julfa.

MEKELBURG, a town of Prussia, in the province of Bartenland; 12 miles S.S.E. of Bartenstein.

MEKES, a town of Curdistan; 30 miles S.S.E. of Betlis.

MEKKIAS, signifying measure, a name given to the Nilometer, situated on an island in the front of old Cairo, about 500 yards in breadth. It is there, in front, that upon the graduations of a pillar the rise of the river is measured, and from the observations made upon it, public cryers go about the streets of Cairo, proclaiming the successive heights of the water, in which are centered all hopes of fertility and abundance. This Nilometer is said to have been built by the Arabs. The island on which it stands is called "Roudda," or gardens, because it is laid out in gardens, and inhabited only by gardeners. See NILOMETER.

MEKLAF AL ASFAT, a town of Arabia, in Yemen; 75 miles N. of Hafec.

MEKZARA, a country of Africa, on the S. side of the Niger, between Casna and Melli.

MEL, GAUDIO, FIAMINGO, in *Biography*, a Flemish musician, by whom the Italians have been generally understood to mean Claude Goudimel, a native of Franche Compté, and a Hugonot, who was one of the first composers of music to the French translation of the psalms by Clement Marot and Theodore Beza; and who was murdered at Lyons in 1572, on the fatal day of the massacre of Paris.

There are certain difficulties in this account, of which we shall speak further elsewhere. See PALESTRINA.

MEL, in *Geography*, a town of Italy, in the Trevisan; 12 miles N.W. of Ceneda.—Also, a small island in the Atlantic, near the coast of Africa. N. lat. 13° 15'.

MEL. See HONEY.

MEL *Cedrinum*, in the *Materia Medica of the Ancients*, a term used to express a sort of liquid manna, used rather as a pleasant sweet in foods than as a medicine, and which seems to have been the same with the *mel roscidum* of Galen, and with the liquid manna of mount Sinai; that mountain having been the place where it was annually collected in large quantities even in Galen's time; and the account Bellonius gives of the manner of collecting it in his time, agreeing very well with what Galen has left about it. It is, however, an error in Bellonius, to suppose this to be the *terenjabin* of the Arabians, that being evidently a solid, not a liquid substance, and being from all accounts the same with what is now called *manna Persicum*, or Persian manna.

The mel cedrinum is a term used only by Hippocrates for this substance, and seems so odd, that many are apt to believe there is an error of the text, and that the author never meant any such thing. Foesius is of opinion, that these ought to be read as two distinct names, with a comma between them, and that the author only meant by them two substances very well known in his time, which were common honey, and the liquid substance called *cedrinum*, or *cedria*.

MEL *Roscidum*, a name given to a kind of liquid manna collected in their time, as it is at present, in considerable quantities, on mount Sinai. The monks who collect it call it *terenjabin*, after the name of a kind of manna, common among the Arabians. But this is an error, the *terenjabin* of those authors not being a liquid manna, but the small round kind, collected from the *albagimaurorum*, and now called *manna Persicum*. It does not appear that the *mel roscidum*, or any other species of manna, was used in medicine by the ancients; this was esteemed a curiosity, rather than a thing of any use, by Galen; and other authors say, it was sweeter than honey itself, with no farther account; whence it seems rather to have been used as a delicacy than as a medicine. See TERENJABIN, and MANNA *Persicum*.

MELA, POMPONIUS, in *Biography*, an ancient geographical writer, was a native of Spain, and flourished A.D. 45. His great work, entitled "De Situ Orbis," divided into three books, is written with elegance, great perspicuity, and brevity. The best editions are those of Gronovius 1722, and Reinhold in 1761. Vossius gave an edition of it with copious notes. In the last edition by Gronovius are added five books "De Geographia," written by some later writer.

MELA, in *Geography*, a department of Italy, deriving its name from a river which rises on the confines of the Trenton, and after crossing the Bressan, runs into the Oglio, near Urtiano. The department is composed of part of the Bressan, and has a population of about 190,689 inhabitants, who elect 15 deputies.

MELA. See MEELAH.

MELA, a river of the Morea, which runs into the sea; 8 miles S.W. of Patras.

MELA, a surgeon's instrument, called also speculum, and by the vulgar a probe.

Its use is to probe ulcers, or draw a stone out of the penis; its form is various, according to the use it is intended for.

MELADA, in *Geography*, a small island in the Adriatic, a little to the N. of Isola Grossa. N. lat. 44° 35'. E. long 15° 56'.

MELÆNA, in *Medicine*, μελανα νόσος in the language of Hippocrates (see his book περὶ νόσων, sect. 5. book ii. edit. Fœs.) a disease characterized by a discharge of black matter by stool?

This affection sometimes occurs together with hæmatemesis, or vomiting of blood, and sometimes without that symptom. The ancients considered that the black matter thrown off by

by the bowels, was that modification of bilious matter which they denominated *black bile*: but recent observation has ascertained that it consists principally of blood, in a grumous or semi-coagulated state, which is poured out slowly from the vessels of the inner coat of the intestines. It is observed generally to be connected with obstruction or congestion of some of the abdominal viscera, as of the liver, spleen, or mesentery. Great debility, and frequent fainting accompany the disease; the pulse is often quickened, though but moderately; and other symptoms of fever are seldom urgent. There is commonly severe pain in the stomach and abdomen, with loss of appetite, nausea or vomiting, headache, and other signs of derangement of the digestive organs.

Gentle purgatives and clysters have been recommended for this complaint from the time of Hippocrates downwards: and they are as beneficial in this affection, as in the hæmorrhæmela, to which it bears much affinity. (See HÆMATEMESIS.) Dr. Home employed the diluted sulphuric acid, in addition to laxatives, and, as he believed, with considerable advantage. Emetics he justly deems useless, if not injurious, and shunned the use of opium, as tending to shut up the matter that nature was carrying off. Opiates, however, combined with gentle cathartics, tend rather to aid the operation of the latter, by removing the spasmodic constrictions which take place in the bowels, and thus also afford material relief to the pains. See Home, Clinical Experiments, sect. 7.—Alfo Hoffman, Med. Rat. Syst. tom. iv. part. i. sect. 1. cap. 3. Morgagni de Sed. et Causis Morbor. epist. xxx. art. 17. Sauvages, class. ix. gen. 11. Portal, Mem. sur plusieurs Maladies, tom. ii. p. 129.

MELAGGE, in *Geography*, a river which rises in Algiers, formed by the union of several streams; which, in its course, takes the name of "Sarratt," and runs into the Mejerda, on the borders of Tunis.

MELAIPOUR, a town of Hindoostan, in the circar of Schaurunpour; 20 miles E.N.E. of Schaurunpour.

MELALEUCA, in *Botany*, from *μειλας*, *black*, and *λευκος*, *white*, a very fine exotic genus of trees and shrubs, so named by Linnæus, because the principal, and indeed original, species was called *Leucadendron*, and *Arbor alba*; words synonymous with its appellation in the Malay tongue, *Caju-puti*, or *White Tree*. We know not why the idea of black was associated with white in the above name. Linn. Mant. 14. Sm. Tr. of Linn. Soc. v. 3. 273. Schreb. 332, excluding the synonyms. Willd. Sp. Pl. v. 3. 1428. Mart. Mill. Dict. v. 3. Juss. 323. Lamarck Illustr. t. 641. Gært. t. 35.—Class and order, *Polyadelphia Icosandria*. Nat. Ord. *Hesperideæ*, Linn. *Myrti*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, turbinate, in five deep, roundish, often coloured, equal segments. *Cor.* Petals five, roundish, inserted into the rim of the calyx, between its segments. *Stam.* Filaments very numerous, in five sets, inserted into the calyx, either opposite to, or alternate with, the petals, various in length and structure; anthers roundish, incumbent. *Pist.* Germen inferior, nearly globular; style thread-shaped, declining, shorter than the stamens; stigma obtuse. *Peric.* Capsule globose, coated, of three cells and three valves, the partitions from the centre of each valve. *Seeds* numerous, minute, angular.

Eff. Ch. Calyx superior, in five deep segments. Petals five. Stamens numerous, very long, in five parcels. Style one. Capsule of three cells.

A fine genus of aromatic trees and shrubs, with lateral inflorescence, and simple entire leaves, all, except the first

species, the produce of New Holland. This genus was confounded by the younger Linnæus, the two Försters, Schreber, and many other botanists, whom Jussieu seemed disposed to follow, with three other genera; see *FABRICIA*, *LEPTOPHYLLUM*, and *METRODORON*. From the two first it is clearly distinguished, as their characters will shew; from the last it differs merely in having the stamens assembled in five sets, not simply icosandrous; the habits of these two genera, and every part of their fructification, except the stamens, being alike. How very different the form of the filaments is in different species of *Melaleuca*, will appear by their descriptions; some being united to a great extent, others but slightly; some in a pinnate, others in a palmate manner; all which being considered, their union at all seems to afford but an artificial character. This however is a sufficiently clear, and, both genera being numerous, a very commodious distinction.

Eleven species of *Melaleuca* are described, by the writer of this article, in the third volume of the Linnæan Society's Transactions, and one in the sixth. These are all adopted by Willdenow. We shall here make some addition to the number, and Mr. Brown, in the second volume of his Prodrômus, will probably increase it much more. The whole are distributed into two sections.

* *Leaves alternate.*

1. *M. Leucadendron*. Greater Cajeput Tree. Linn. Mant. 105. Suppl. 342, 2. Sm. Tr. of Linn. Soc. v. 3. 274. (*Myrtus Leucadendra*; Linn. Sp. Pl. 676. *Arbor alba*; Rumph. Amboin. v. 2. 72. t. 16.)—*Leaves* alternate, lanceolate, pointed, obliquely falcate, five-ribbed. *Footstalks*, young branches, and germen, smooth.—Native of some parts of the East Indies, especially the Molucca islands, Ceram and Amboyna, growing in hilly places, flowering from January to March, and ripening fruit from August to November; but according to Rumphius, it is rarely propagated by seed. This is described by that accurate writer, as a large tree, as thick as a man's body, or much thicker, with many irregular widely spreading branches, but not of a lofty growth. *Leaves* scattered, on short smooth *footstalks*, lanceolate, entire, smooth, tapering at each end, but most at the extremity, curved laterally into a sickle shape, from five to eight inches long, scarcely an inch broad in the widest part, furnished with five principal ribs, connected by intermediate interbranching veins. *Stipulas* none. *Flowers* white, in long, loose, somewhat whorled spikes, whose smooth common stalk terminates in a leaf-bud, and becomes a branch. The bundles of *stamens* are $\frac{2}{3}$ ths of an inch long, and each divided nearly to the base. *Germen* scarcely so large as a hemp-seed, globose, smooth, quite sessile, the *capsules* remaining long firmly fixed to the branch, surmounted by leaves, after the seeds have fallen out, as is common to the whole genus. Rumphius speaks much of the resinous and aromatic properties of this tree, its whitish or grey aspect, and its agreeable shade. The wood is hard and heavy, but easily splits and soon decays, being neither beautiful nor useful. The outer bark is of a spongy nature, and much used for caulking vessels, as it swells in the water; but is nevertheless liable to shrink again, and give way. It is called *baru*, a name given to all substances used for that purpose. An oil is obtained by firing the tree, which soon becomes thick and is used for candles. Rumphius says nothing of any essential oil being procured by distillation from this tree; see the next species.

2. *M. minor*. Lesser Cajeput Tree. *Arbor alba minor*; Rumph.

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Rumph. Amboin. v. 2. 76. t. 17.)—Leaves scattered, elliptic-lanceolate, bluntish, straight, five-ribbed. Young branches and germens downy.—Native of Amboyna, but less frequent than the foregoing, with which it has been confounded by every body but Rumphius. We now venture, for the first time, to distinguish them. This is smaller in all its parts, and rather a shrub than a tree. The young leaves are extremely silky; adult ones nearly smooth, about two (scarcely three) inches long, and one broad, exactly elliptical, and not oblique or falcated. *Footstalks* broad and very short, somewhat hairy. Young branches, where the flowers are seated, densely clothed with white silky prominent down, as is likewise the *germen*. The *calyx* is but slightly downy. *Fruit* smooth, depressed and truncated.

The late Mr. Christopher Smith, from whom we have received specimens of both these plants, assured us of this being what yields the oil of Cajeput, and Rumphius gives the same account. (See CAJEPUT.) The bark is woody and brittle throughout, not externally corky like the former. The structure of their parts of fructification is the same in both, especially the form of the *stamens*. Rumphius's plates are by no means calculated to give a just idea of the foliage of either, especially of the present, but his descriptions are excellent.

3. *M. viridiflora*. Green-flowered ribbed Melaleuca. Gært. v. 1. 173. t. 35. Sm. Tr. of L. Soc. v. 3. 275. (*M. Leucadendron*; Forst. Prod. 38. Linn. Suppl. 342. β . *Metrofideros quinqueria*; Cav. Ic. v. 4. 19. t. 333.)—Leaves alternate, elliptic-lanceolate, straight, bluntish, coriaceous, five-ribbed. *Footstalks* and young branches downy. *Germen* nearly smooth.—Native of New Caledonia and New South Wales. The younger Linnæus confounded it with both the preceding. From the first it is abundantly distinct. With the second it more agrees in the shape of its leaves, but differs in their thick rigid texture, and much longer more downy *footstalks*. The flowers are twice as large, green, not white, with a smooth or very slightly hairy *germen*. The form of the *stamens* is the same. The young leaves of the present species are finely downy, but scarcely silky.

4. *M. suaveolens*. Sweet-scented Melaleuca. Gært. v. 1. 173. t. 35.—Leaves alternate, elliptical, single-ribbed. *Flower-stalks* axillary, forked, downy, twice as long as the *footstalks*. Filaments shorter than the petals, somewhat pinnate. Native of the warmer part of New Holland, near Endeavour river. A plate of this, communicated by sir Joseph Banks to Linnæus, is in our possession. It appears to be a handsome tree, with elliptical smooth entire leaves, tapering at each end, single-ribbed, five or six inches long and two broad. *Footstalks* an inch long. *Flower-stalks* nearly twice that length, downy, axillary, sometimes in pairs, forked, each bearing seven handsome white flowers, whose *stamens* are much shorter than the petals, and pinnated in their lower part. The *germen* and *calyx* are downy.

5. *M. laurina*. Laurel-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 275.—Leaves alternate, obovate-lanceolate, single-ribbed. *Flower-stalks* axillary, forked, downy, about as long as the *footstalks*. Filaments rather shorter than the petals, somewhat pinnate.—Native of New South Wales, communicated by sir Joseph Banks. It is very nearly related to the last, but not at all aromatic, which that should seem by its name to be, and the leaves of the present are broadest towards the top, very narrow and taper at their base. The *footstalks* are bordered, and so connected with the leaf, it is hard to fix the limits of each. *Flower-*

stalks axillary, not an inch long, forked, silky, bearing five or seven flowers, half the size of the *suaveolens*. *Stamens* hairy, rather shorter than the petals. *Germen* and *calyx* downy.

6. *M. stypheloides*. Sharp Twisted-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 275.—Leaves alternate, ovate, twisted, many-ribbed, with a spinous point. *Calyx-teeth* sharp-pointed, ribbed.—Native of Port Jackson, New South Wales. This has the habit of a *Styphelia*, and is scarcely at all aromatic. The numerous leaves are sessile, scattered, not an inch long, ovate, twisted, rigid, pungent, entire, smooth, rather glaucous, striated with innumerable nerves. Young branches very hairy, bearing in their lower part short crowded circles of sessile white flowers. *Germen* and *calyx* downy; the teeth of the latter erect, rigid, spinous, ribbed. *Stamens* palmate, much longer than the petals. M. Ventenat says, there were many fine plants of this species, in his time, at Malmaiton, but none had then blossomed.

7. *M. squarrosa*. Various-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 6. 300. Donn. Cant. ed. 4. 186. (*M. myrtifolia*; Vent. Malmaif. t. 47.)—Leaves scattered or opposite, ovate, pointless, five or seven-ribbed. *Calyx-teeth* pointless, smooth.—Native of the east and west coasts of New Holland. We first saw it in the Cambridge garden in 1799. The leaves spread in three or four rows, according as they are scattered or opposite, they have about seven remote ribs, and are blunt without any spine. Flowers white, encircling the hairy branches in long dense masses. *Germen* and *calyx* smooth, the latter blunt, without thorns or ribs. *Stamens* much longer than the petals, collected into five bundles, but not completely, many of the filaments being distinct, as in the genus *Citrus*; so that the limits between *Melaleuca* and *Metrofideros* here become almost evanescent. The stigma too in this species is quite simple, not so tumid or capitate as in most other *Melaleuca*.—Perhaps *M. decussata* of Mr. Donn's Hort. Cant. ed. 5. 186, is but a variety of this.

8. *M. diosmifolia*. Green-flowered Reflexed Melaleuca. Andr. Repof. t. 476.—Leaves scattered, reflexed, elliptic-oblong, obtuse, single-ribbed. *Calyx-teeth* rounded, smooth.—Native of King George's Sound, on the west coast of New Holland, where it was found by Mr. Menzies. We gathered it in flower, in June 1807, in the conservatory of Claude Scott, esq. at Sundridge park, Kent. A tall shrub, with many spreading branches, clothed with numerous, scattered, crowded, stalked, reflexed leaves, about half an inch long, nearly elliptical, dark green; smooth and even above; dotted and single-ribbed beneath. The flowers are green in every part, rather large, thickly crowded for an inch or two along the middle part of each branch, their long *stamens*, which are united by their base into five bundles, projecting horizontally all round. The anthers, or at least their pollen, is yellow. Stigma obtuse. Capsules large, thickly coated, crowded into irregularly angular figures.

9. *M. microphylla*. Small-leaved Melaleuca.—Leaves scattered, imbricated, cylindrical, obtuse, somewhat spreading. Flowers crowded at the upper part of the branches. This hitherto non-descript species was gathered near King George's Sound, on the west coast of New Holland, by Mr. A. Menzies, who favoured us with a specimen. The stem is shrubby, much branched in a determinate manner; the branches smooth, whitish, leafy throughout. Leaves very numerous, crowded, a little spreading, about a quarter of an inch long, cylindrical or obscurely quadrangular, very blunt,

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blunt, unarmed, smooth, pale green, with a strong aromatic resinous flavour; each supported by a short, slender, smooth *footstalk*, jointed at its base. *Flowers* white, crowded into an oval spike at the summits of a few of the branches, which are not extended beyond them, but still the inflorescence is lateral. *Stamens* in five sets, those of each set united, a good way up, into a flat linear base or common filament, which reaches beyond the *petals*. *Germs* and *calyx* smooth. *Capsule* turbinate. This is most akin to the next.

10. *M. ericifolia* Heath-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 276. Exot. Bot. v. 1. 65. t. 34.—Leaves scattered or opposite, linear, acute, nerveless, pointless, a little recurved. Flowers crowded at the upper part of the branches.—Native of Port Jackson, New South Wales. This and the last are the smallest we have seen of the genus. Both have the habit of *Erica*. The present is very smooth in all its parts, and has the taste and smell of Coriander seeds. The *branches* are prettily striped with green and white. *Leaves* from half an inch to an inch in length, flat-tish, linear, very narrow, acute, but without any spinous point, destitute of rib or veins, a little convex beneath. *Flowers* yellowish-white, crowded into oval or oblong spikes at the top of almost every branch, which is commonly a little prolonged, and leafy, above them. *Germs* and *calyx* smooth. *Stamens* strongly united in five sets, but their common claws do not extend beyond the petals. The *flower-buds* are reddish.

11. *M. nodosa*. Needle-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 276. Exot. Bot. v. 1. 67. t. 35. Vent. Malmaif. t. 112? *Metrosideros nodosa*; Gærtn. v. 1. 172. t. 34. Cavan. Ic. v. 4. 19. t. 334.—Leaves scattered, linear, straight, tipped with spinous points. Flowers crowded near the tops of the little side branches. Filaments palmate.—From the same country as the last. It has long been known in the gardens. The stouter taller habit; straight pungent *leaves* above an inch long; and the much shorter, almost globular, masses of yellow *flowers*, each of which is borne on a short lateral branch, distinguish this species from the last. The flowering branches have leafy terminations. The bundles of *stamens* are palmate, their united part shorter than the petals.

12. *M. armillaris*. Slender-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 277. (*M. ericifolia*; Andr. Repof. t. 175. Vent. Malmaif. t. 76. *Metrosideros armillaris*; Gærtn. v. 1. 171. t. 34.)—Leaves scattered, linear, somewhat recurved. Flowers crowded at the lower part of the branches. Filaments very long, linear; many-cleft and radiating at the summit.—Native of New South Wales. It has long been in the gardens. We have seen it trained against a wall to the height of several feet, in the open air, covered with flowers in May, and requiring only the shelter of a mat or glass frame in winter. It differs from *M. nodosa* in its less rigid, and somewhat recurved, *leaves*, scarcely spinous at the tip; much longer series of *flowers*, which are white; and particularly in the long linear base of each cluster of *stamens*, which is extended to twice the length of the petals, and then branches off at once into numerous radiating filaments of no considerable length. We have always found the *flowers* situated about the lower part of each branch; Ventenat represents them near the end. So, on the contrary, his plate of *M. nodosa* has the flowers on the lower parts of very long leafy branches, very different from what we have observed. It seems therefore that the relative situations of the fructification vary in these plants, though the comparative number of flowers in each is constant.

13. *M. genistifolia*. Broom-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 277. Exot. Bot. v. 1. 107. t. 55.—Leaves scattered, lanceolate, sharp-pointed, three-ribbed, closely dotted. Flowers loosely scattered. Filaments pinnate in their upper part. Style hairy.—Native of New South Wales, where the first settlers called it the White Tea-tree. It is said to grow "in a good soil, mostly near the water-side," being covered with white blossoms in November. We have met with it in no garden. In its native soil the *stem* attains the height of twenty or twenty-five feet. The *branches* and *leaves* are smooth; the latter lanceolate, scarcely three quarters of an inch long, acute, flat, marked with three ribs, and numerous resinous dots at the back. Their flavour is pleasantly aromatic, not strong. *Flowers* scattered, in alternate pairs, towards the tops of the small terminal branches, which are slightly downy in that part. The claws of the united *stamens* are about as long as the petals before they divide; they then become pinnate, and towards the top are more closely branched. *Germs* and *calyx* smooth. *Style* hairy.

•• *Leaves opposite.*

14. *M. linearifolia*. Toad-flax-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 278. Exot. Bot. v. 1. 109. t. 56. (*Metrosideros hyslopifolia*; Cavan. Ic. v. 4. 20. t. 336. f. 1.)—Leaves opposite, linear-lanceolate, three-ribbed, closely dotted beneath. Flowers loosely scattered. Filaments pinnate all the way up. Style smooth.—Native of the country about Port Jackson, New South Wales. We have seen it flowering at Mr. Scott's of Sundridge park. In its native soil this species forms a large tree, whose outer bark is easily stripped off, in large light thick spongy flaky portions, which serve the rude natives as a warm wrapper for their new-born infants. The European settlers found it answer the purpose of tinder. The *branches* are smooth. *Leaves* opposite, nearly sessile, an inch and a half, or two inches long, narrow, linear-lanceolate, acute but not pungent, marked with three slight ribs above, much dotted on both sides; the mid-rib keeled beneath. *Flowers* numerous, loosely disposed, cream-coloured, with a tinge of red in the petals. *Stamens* very long, each bundle regularly pinnate, almost from the very base to the end. *Style* short, smooth, as well as the *germs* and *calyx*. Every part is highly aromatic, with a flavour resembling pepper-mint.

15. *M. abietina*. Fir-leaved Melaleuca.—Leaves opposite, elliptic-oblong, concave, blunt, ribless. Flowers few, at the ends of the branches. Filaments long, linear, many-cleft at the summit. Communicated by Mr. Menzies, who gathered it at King George's Sound, on the west coast of New Holland. This seems to be a stout *shrub*, or *tree*, with numerous, strong, leafy, smooth *branches*. *Leaves* about half an inch long, crowded, opposite, in pairs crossing each other, on short broad *footstalks*; they are concave above, with a very blunt point; convex beneath, destitute of ribs, veins, or dots. *Flowers* reddish, few together, in short, ovate, apparently terminal spikes, beset with many imbricated, reddish, ribbed and keeled *bracteas*. It seems doubtful whether the branches be ever continued, in a leafy form, beyond the insertion of the flowers, which if they be not, would overset a character in the habit of this genus on which we have always depended. Our specimen however is insufficient to decide this question. The bundles of *filaments* are linear and simple to a considerable extent (but not to the extremities of the petals, which are longer than usual); then they suddenly branch off into numerous divisions, each bearing its *anther*, as in the other species. *Style* smooth, longer than in the last, but much shorter than the *stamens*. *Germs* and *calyx* smooth.

16. *M. thymifolia*. Thyme-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 278. Exot. Bot. v. 1. 69. t. 36. (*M. coronata*; Andr. Repof. t. 278. *M. gnidiazfolia*; Vent. Malmaif. t. 4. *Metrofideros calycina*; Cavan. Ic. v. 4. 20. t. 336. f. 2.)—Leaves oppofite, elliptic-lanceolate, acute, ribbed. Flowers few together, on fhort lateral branches. Filaments oppofite to the petals, branched more than half way down.—Native of New South Wales. It was firft raifed in England, if we miftake not, by Mr. Fairbairn at Chelsea garden, and is not very uncommon in green-houfes. This fpecies is a little, fender, fmooth, bufhy fhrub, about two feet high, with numerous fmall, fmooth, oppofite thyme-like leaves, full of refinous dots beneath, and highly aromatic. Flowers rofe-coloured, abundant, though but few together, on fhort lateral branches, not always furmounted by leaves. The germen and calyx are fmooth. Filaments oppofite to the petals, which is remarkable, and as far as we can examine our dried fpecimens of others, peculiar to this and the next fpecies. They are twice the length of the petals, and confift of one broad flat compound filament, fending off from its margin and inner furface abundance of fimple filaments with anthers, almoft to its very bafe. Style fmooth, rather fhorter than the ftamens.

17. *M. hypericifolia*. St. John's-wort-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 279. Vent. Jard. de Cels, 10. t. 10. Andr. Repof. t. 200.—Leaves oppofite, fpreading, elliptic-oblong, fingle-ribbed. Flowers numerous, on fhort lateral branches. Filaments oppofite to the petals, very long, linear, radiating at the fummit.—Found in fwamps at New South Wales. This is now not unfrequent in the green-houfes and confervatories of England, where it makes an elegant appearance, being, in our opinion, the moft beautiful of the genus. The ftem is fhrubby, fix feet high, with lax fpreading branches. Leaves numerous, horizontal, oppofite, croffing each other in pairs, elliptical, fmooth, about an inch long, with much of the habit of an *Hypericum*. Flowers on fhort, lateral, fattered branches, many together, in denfe cylindrical mafles. Calyx and germen fmooth, green, very glandular and refinous. Petals green or reddifh, with refinous dots at the back. Filaments oppofite to them, the common bafe of each cluster three or four times the length of the petal, and of the fame colour, linear and narrow, terminating in a very large radiating tuft of long, capillary, crimfon, filk-like threads, each bearing a fmall red anther, with yellow pollen. Thefe crimfon threads, combining all round into a clofe maf, almoft concealing the reft of the flower, conftitute the chief beauty of the whole. It was miftaken for a *Bankfia* by one of the firft convicts who went to New South Wales, and who fent a very characteristic drawing to England of this plant, among fome of lefs accuracy.

18. *M. neriifolia*. Oleander-leaved Melaleuca. Sims in Curt. Mag. v. 26. t. 1058. (*M. falicifolia*; Andr. Repof. t. 485.)—Leaves oppofite, lanceolate, fingle-ribbed. Flower-ftalks axillary, forked, nearly fmooth. Stamens fhorter than the corolla, fcarcely cohering.—Native of New Holland, we know not precifely from what part of that extenfive country. It is faid to have been firft raifed from feed by Mr. Barr of Ifington. This is very different from all the reft of the prefent fection, having yellow flowers, on axillary forked ftalks, being next akin in habit to *M. fuaaveolens* and *laurina* of the former divifion; but its leaves are oppofite. Their figure is lanceolate, about two inches long, and the under fide is pale. The ftamens are defcribed by Dr. Sims as collected into five bundles, fhorter than the petals, but hardly cohering; Mr. Andrews delineates thefe bundles as oppofite to the petals, with the filaments feparate almoft to

the very bafe. Whether Mr. Brown, from whom in his *Prodromus* v. 2, and Ait. Hort. Kew, we may expect additions to this genus, has made any generic divifion of it, we are not informed; but Dr. Sims hints at the propriety of fuch a meafure.

Mention of more fpecies than we have defined will be found in Mr. Donn's Hort. Cant. but fome of thofe are certainly not different. His *neriifolia* and *falicifolia* are, we prefume, our laft fpecies, under the names of Sims and Andrews. His *coronata*, and probably *fimbriata*, are our *thymifolia*, which he has likewife. His *diosmeifolia* and *armillaris* we judge to be one and the fame, as perhaps is his *ericifolia*. This intelligent botanift and cultivator is neceffarily liable to be mifled, by the communications of his friends, who fend the fame thing under different names, nor are the plants always in a condition for determination till it is too late for his purpofe. S.

MELALEUCA, in the *Materia Medica*. The *Melaleuca minor* is that fpecies, which yields the *Cajeput* oil, and not the *M. leucadendron*, as mentioned under that article. See the preceding article.

The *Cajeput* oil, called alfo "Oleum Wittnebianum," from Wittneben, who gave an account of the procefs for obtaining it, though unknown in Britain, is now admitted into the *Materia Medica* of all the principal foreign pharmacopeias. It is imported into Europe from the Eaft Indies, and is diftilled chiefly in the ifland of Banda. From its exorbitant price it is frequently adulterated; and is therefore feldom found perfectly pure in Europe. *Cajeput* oil appears to be a powerful medicine, and is much efteemed in Germany, as well as in India, as a general remedy in chronic and painful complaints. It is ufed for the fame purpofes for which we employ the officinal ethers, to which it feems to have a confiderable affinity; the *Cajeput*, however, is more potent and pungent; taken into the ftomach, in the dofe of five or fix drops, it heats and ftimulates the whole fyftem, proving at the fame time a very certain diaphoretic, by which, probably, the good effects it is faid to have in dropfies and intermittent fevers are to be explained. For its efficacy in various fpafmodic and convulfive affections, it is highly efteemed; and numerous inflances of its fuccefsful employment are publifhed by different authors, cited by Murray. It has been alfo ufed both internally and externally with much advantage in feveral other obftinate diforders, as palfy, hypochondriacal and hysterical affections, deafnefs, defective vifion, tooth-ache, gout, rheumatifm, menftrual obftructions, herpetic eruptions, &c.; of which Thunberg gives a particular relation. The dofe is from two to fix and even twelve drops. Woodville Med. Bot. See CAJEPUT oil.

MELALIEH, in *Geography*, a town of Egypt; 10 miles N. of Abugirgé.

MELAMPODIUM, in *Botany*, is a Linnæan genus whole derivation may eafily be traced from μέλας, black, and ποῦς, a foot. According to the defcription of it in his *Hortus Cliffortianus*, it fhould feem that Linnæus had in view the fimilitude of the feed of the female florets to the foot of a goat.—In the *Critica Botanica* however it is faid to be named in honour of the Greek phyfician Melampus.—Linn. Gen. 445. Schreb. 583. Willd. Sp. Pl. v. 3. 2338. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 269. Juff. 188. Lamarck Illuftr. t. 713. Gært. t. 169.—Clafs and order, *Syngenefia Polygamia Necessaria*. Nat. Ord. *Compositæ Oppofitifoliae*, Linn. *Corymbiferae*, Juff.

Gen. Ch. Common calyx flat, much fpreading, of five, oblong-ovate leaves, the length of the florets. Cor. compound, radiated; the apparently perfect florets conftituting

the disk; female ones about five, making the radius: that of the florets of the disk of one petal, funnel-shaped, five-toothed, erect; of the radius ligulate, ovate, entire or three-toothed. *Stam.* in the disk, Filaments five, very small; anthers cylindrical, tubular. *Pist.* in the same florets, Germen very small, abortive; style brittle-shaped, the length of the corolla; stigma obsolete: in the female ones, Germen nearly ovate, compressed, rough at the sides, flat and membranous at the top; style very short. *Peric.* none, except the unchanged calyx. *Seeds* in the disk none; in the radius solitary to each floret, obovate, compressed, quadrangular, prickly at the sides, crowned with a heart-shaped, partial calyx, involute and converging at the margin. *Recept.* chaffy, conical; scales lanceolate, coloured, the length of the florets.

Eff. Ch. Receptacle chaffy, conical. Seed-down of one leaf, converging. Common calyx of five leaves.

1. *M. americanum.* Linn. Sp. Pl. 1303. (*Caltha americana*, &c., Banks. Reliq. Houst. 9. t. 21.)—Stem erect. Leaves linear-lanceolate, pinnatifid.—Found by Houston, near Vera Cruz, in a craggy, sandy soil, where it flowered and ripened fruit in March.—Stems herbaceous, numerous, round, villose, procumbent. Leaves opposite, an inch and half long, usually with two lateral segments, sometimes entire; hairy on both sides, but more particularly at the back. Flowers solitary, yellow, upon axillary stalks. Seeds forming a crown, and supplying the place of the florets of the radius.

The specific character of this plant given in the *Species Plantarum* of Linnaeus differs so much from Houtton's figure, as well as from the description in *Hortus Cliffortianus*, which seems made from the same specimen, that we have presumed to alter it.—Possibly when he wrote the second edition of the *Species Plantarum*, not having any specimen before him, he did not sufficiently attend to what he had previously recorded.

2. *M. humile.* Swartz. Prod. 114. Ait. Hort. Kew. ed. 1. v. 3. 269.—Stem erect. Leaves toothed, somewhat lyrate, sessile.—A native of Jamaica and St. Domingo, flowering from June to October.—Nothing is known of this species but from the authors above quoted, and not being able to refer either to a specimen or a figure of it, we must of course be content with copying their specific character.

3. *M. australe.* Linn. Sp. Pl. 1303. Willd. n. 3. (*M. australe*, semibus quinque oblongis hispida, calyce pentaphyllo, caule decumbente; Læfl. It. 268.)—Stem decumbent. Leaves oval, serrated.—Found at Cumana in South America by Læssing, who describes the Root as perennial. Stems a span long, somewhat downy, with opposite decumbent branches ascending towards their extremities. Leaves opposite, on footstalks, oval or obtusely ovate. Flowers terminal, yellow, on short footstalks. Seeds furrowed, and covered with hooked hairs.

These three species are all that are known of the genus *Melampodium*. Of the two last we are not acquainted with any figure. Professor Martyn observes, that they are all tender plants requiring much shade and warmth. The seeds should be sown in the spring in a hot-bed, and the plants removed in due time into pots filled with light sandy earth.

MELAMPEDIUM, in the *Materia Medica*. See HELLEBORE and HELLEBORUS.

MELAMPUS, in *Biography*, was enumerated among the early civilizers of Greece, who thought it necessary to travel into Egypt to qualify themselves for the high employments at which they aspired in their own country. Orpheus

proceeded thence a legislator and philosopher; and Melampus who had different views, commenced, at his return, physician and diviner, arts which in Egypt were professed together. Apollodorus says, that he was the first who cured diseases by medicinal potions. Physic had its miraculous powers during the infancy of the art, as well as music; and life and health being esteemed more precious and solid blessings than the transient pleasures of the ear, bore a much higher price: for though bards were often distinguished by royalty, and their talents recompensed by gifts and honours, yet we do not find in ancient records that any one of them ever experienced such munificence as Melampus. It is related by Pausanias, that having cured the daughters of Prætus, king of Argos, of an atrabilious disorder, with hellebore, he was rewarded with one of his royal patients for wife, and a third part of her father's kingdom in dowry.

MELAMPYRUM, in *Botany*, is the *Μελαμύρον* of Theophrastus, derived from *μύρα*, black, and *πυρός*, wheat; its seeds greatly resembling the grain of wheat, but of a darker colour. In some however, indeed in all the Linnæan species, they are so like wheat in form, size and colour, as to be scarcely discernible from it.—Cow-wheat.—Linn. Gen. 305. Schreb. 401. Willd. Sp. Pl. v. 3. 197. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 651. Ait. Hort. Kew. ed. 1. v. 2. 328. Tournef. t. 78. Juss. 101. Lamarck Dict. v. 4. 19. Illustr. t. 518. Gærtner. t. 53.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personate*, Linn. *Pedicularales*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, permanent, cloven half way down into four, slender segments. Cor. of one petal, ringent; tube oblong, recurved; limb compressed: upper lip helmet-shaped, compressed, emarginate, the lateral little margins reflexed; lower lip flat, erect, the length of the upper, obtuse, cloven half way down into three, equal segments, marked with two prominences in the middle. *Stam.* Filaments four, awl-shaped, curved, concealed under the upper lip, two of them shorter; anthers oblong. *Pist.* Germen superior, acuminate; style simple, in place and length like the stamens; stigma obtuse. *Peric.* Capsule oblong, oblique, pointed, compressed, its upper margin convex, the lower straight, of two cells and two valves, opening at the upper suture; partition contrary. *Seeds* in pairs (solitary according to Gærtner), ovate, gibbous, enlarged at the base.

Eff. Ch. Calyx tubular, four-cleft. Upper lip of the corolla compressed, folded back at the margin. Capsule of two cells, oblique, bursting at one edge. Seeds two, gibbous.

1. *M. cristatum.* Crested Cow-wheat. Linn. Sp. Pl. 842. Engl. Bot. t. 41.—Spikes quadrangular. Bractæas heart-shaped, imbricated, compact, toothed.—An English plant, though by no means a common one. It has been found both in Cambridgeshire and in Norfolk, on the borders of woods, and in corn-fields, flowering in July. The specimen figured in English Botany was sent from Madingley wood, near Cambridge.—Root annual. Stem rough, much branched. Leaves opposite, linear, entire. Spikes of flowers terminal, imbricated, very ornamental, being of a yellow, purple and tawny colour.—Linnaeus however observes that there is a variety which has white flowers.

2. *M. arvense.* Purple Cow-wheat. Linn. Sp. Pl. 842. Engl. Bot. t. 53.—Spikes conical, loose. Bractæas fringed with narrow taper teeth.—This like the last may be considered as a rare native plant, though occurring occasionally in various parts of England, in gravelly fields, and flowering in July and August.—Root annual. Stem about two feet high,

high, erect, much branched, rough. *Leaves* lanceolate, pointed, entire. *Spikes of flowers* terminal, of a yellow and purple colour, extremely ornamental, indeed so much so that Dr. Smith observes "we are scarcely worthy to possess it, for its charms, however striking, have never procured it admission into a flower-garden, though it may easily be raised from fresh seed on a dry gravelly soil."

3. *M. barbatum*. Bearded Cow-wheat. Willd. n. 3. Wadstein and Keisabel Pl. Rar. Hung.—Spikes conical, loose. Bractæas toothed and bristle-shaped, not coloured. Calyx-teeth bearded. Corolla gaping.—A native of fields in the south of Hungary. — This new species is adopted on the authority of Willdenow, who says that it is very closely allied to the last, but differs in the following particulars. Bractæas green, not coloured. Calyx-teeth furnished with long, transparent, membranous hairs at the margin. Upper lip of the corolla more hairy. Flowers by no means variegated, but altogether of a yellow colour.

4. *M. nemorosum*. Many-coloured Cow-wheat. Linn. Sp. Pl. 843. Fl. Suec. 214. Fl. Dan. t. 305.—Flowers leaning one way, lateral. Bractæas toothed, heart-shaped, lanceolate, the upper ones coloured, sterile. Calyx woolly.—A native of woods in the north of Europe, and especially of some provinces of Sweden. Dr. Smith also found it in Savoy.—It flowers in July and August.—Root annual, small. Stem somewhat more than a foot in height, upright, branched. Leaves entire, ovate, pointed, occasionally rather arrow-shaped, toothed at the base. Bractæas violet-coloured, lacinated at the base, those at the top barren. Flowers of a beautiful yellow and purple colour.—The splendour of this species has attracted the notice of various botanists. Linnæus mentions it in his *Flora Suecica* with great delight, which has drawn forth the following observation from Dr. Smith in his *Tour on the Continent*, ed. 2. v. 3. 149. Speaking of *M. nemorosum* he says, "The red and yellow flowers, amid sky-blue and purple bractæas, form the richest combination possible, which, but in the hands of nature, would be tawdry. Well might Linnæus esteem this plant worthy to decorate the palace of Flora herself."

5. *M. pratense*. Common yellow Cow-wheat. Linn. Sp. Pl. 843. Engl. Bot. t. 113.—Flowers lateral, leaning one way. Leaves in distant pairs. Corolla closed.—Common in woods and thickets throughout England, flowering through the summer.—Root annual, branched, spreading, smooth. Stem slender, branched. Leaves lanceolate, smooth, occasionally toothed at the base. Bractæas pinnatifid, often purplish. Flowers solitary, all leaning one way, yellow, their upper lip fringed with dense hairs, the lower one straight; anthers cohering together at their tips.—We find the following observation in *English Botany*. "Linnæus says, the best and yellowest butter is made where this plant abounds. All authors have copied him, and we do not scruple to do the same, in hopes that somebody will in time be induced to make experiments on the subject in England, where this plant is far from uncommon, flowering all summer long."—This property of *M. pratense* is mentioned in the *Lapland Tour of Linnæus* v. 1. 110, as well as in the *Flora Lapponica* n. 240, where he confounds it with the following as one species.

6. *M. sylvaticum*. Wood Cow-wheat. Linn. Sp. Pl. 843. Engl. Bot. t. 804.—Flowers lateral, leaning one way. Leaves in distant pairs. Corolla open, with its lip bent downwards.—Found occasionally in mountainous woods or pine forests, flowering in July.—The habit of this species is extremely similar to that of the last, but it is upon the whole considerably smaller.—Root annual. Stem roughish. Leaves a little broader, less black from drying, all of them

generally entire. Flowers twice as small, of a yellowish-orange colour, especially at the mouth. Capsule marked with a net-work of prominent veins.

7. *M. lineare*. Linear Cow-wheat. Willd. n. 7. Lamarck Dict. v. 4. 23.—Leaves linear, entire. Flowers axillary. A native of Carolina, where it was discovered by Mr. Frazer.—All that we know of this is from the authors above quoted, who tell us that it is more diminutive than any other species of this genus, in habit greatly resembling *Euphrasia linifolia*.—Root annual. Stem about five inches high, round, erect, furnished with opposite, somewhat quadrangular, branches. Leaves opposite, sessile, an inch long, little more than a line broad, acute. Flowers in the bosoms of the upper leaves, about three lines in length. Calyx half the length of the corolla, which is gaping, with equal lips, the upper one obtuse, villose at the margin.

The several species of *Melampyrum*, though extremely elegant and ornamental when fresh, are at the same time remarkable for turning brown or black when dry, losing all traces of their living beauty, and making a shabby appearance in the Herbarium. "The seeds of this genus have a remarkable resemblance to grains of wheat; on which account (says Dr. Smith) we prefer the old English name to that of *Cow-grass*, given by Dr. Stokes."

MELAN PHARMACON, a word used by Hippocrates, and by some supposed to mean common writing ink. He orders this to be poured upon the cranium, in case of a fissure, in order to discover how far it has penetrated. Galen seems to refer to this, in some places, and mentions his having treated of it in his book of ulcers; but as no such medicine is found prescribed here, it is probably one of the lost compositions of the ancients. In the spurious edition of Hippocrates, his book treating on the diseases of women, there is a black medicine ordered to be made of the squamæ and flos æris.

MELANA, or MÆLENA, in *Ancient Geography*, a town of Arcadia, in the western part, on the river Alpheus, S.W. of Tegea.

MELANAETOS, in *Ornithology*. See FALCO.

MELANAGOGUES, MELANAGOGA, from μέλας, black, and γωγῆ, I draw, such medicines as were believed to possess the particular power of evacuating black bile, one of the four humours of the ancient pathology.

MELANANTHERA, in *Botany*, was so called by Michaux, from μέλας, black, and ἀνθήρα, an anther, because of the colour of the anthers, which is strongly contrasted with the white corolla. Michaux Boreali-Amér. v. 2. 106.—Class and order, Syngenesia Polygamia-aqualis. Nat. Ord. Composita oppositifolia, Linn. Corymbifera, Juss.

Gen. Ch. Common calyx imbricated, of several, not very numerous, oval, flatish, close-pressed, unarmed leaves, in two rows. Cor. compound, discoid; florets uniform, numerous, all perfect, though some of the central ones are usually abortive; all funnel-shaped, with a short tube, and a much longer and wider, tubular, five-cleft, regular limb, whose segments are lanceolate and cohering. Stam. Filaments five; anthers forming a cylinder, shorter than the corolla. Pist. Germen obovate, angular, abrupt; style thread-shaped, projecting a little beyond the anthers; stigmas two, oblong, revolute, slightly tapering. Peric. none, except the permanent calyx. Seeds turbinate, quadrangular, smooth, abrupt at the top, with a small annular border, and a crown of very few, (about five,) erect, rough, deciduous bristles. Recep. rather convex, with a firm, keeled, concave, ribbed scale to each floret, at length overtopping the seeds and much resembling the calyx-scales.

Ess. Ch. Receptacle convex, with obovate, keeled, rigid scales.

scales. Seeds square. Crown of a few rough bristles. Calyx of two rows of uniform, ovate, imbricated leaves.

Obf. This genus differs so much in habit from *Bidens*, with which Linnæus confounded it, that we cannot but think Michaux right in separating them. The ovate uniform calyx leaves, and the scales of the receptacle, so closely resembling them, in the feeding state, that the whole head of seeds assumes one uniform scaly aspect, added to the number and nature of the bristles of the seed crown, which are not in one or two pairs, but of an indeterminate number, all uniform, and rough with minute ascending points, not barbed with sharp reflexed spines; these characters are sorely sufficient marks of distinction.

1. *M. hastata*. Michaux. v. 2. 107. (*Bidens nivea* β and γ ; Linn. Sp. Pl. 1167. *B. scabra*, flore niveo, &c.; Dill. Elth. t. 46 and 47.)—Leaves three-lobed, somewhat bilate. Scales of the receptacle lanceolate, taper-pointed—Native of Carolina. It was cultivated in the Eltham garden before the year 1732, and flowered late in autumn. The root is perennial. Stems herbaceous, two or three feet high, rough, somewhat branched, leafy. Leaves opposite, stalked, rough and harsh, serrated; sometimes slightly, sometimes very deeply, hastate. Dillenius figures both varieties. Flowers terminal, an inch broad, on long stalks. Corollas white. Anthers black. This probably is the *Bidens nivea* of Mr. Donn's Hort. Cant., which is there marked as a hardy perennial, flowering in June and July.

2. *M. deltoides*. Michaux. v. 2. 107. (*Bidens nivea* α ; Linn. Sp. Pl. 1167. Swartz. Obf. 296. Ait. Hort. Kew. ed. 1. v. 3. 154. *Cala aspera*; Jacq. Ic. Rar. t. 583.)—Leaves ovate or heart-shaped, all undivided. Scales of the receptacle bluish.—Native of the West Indies. Swartz says it grows in grassy, cultivated, elevated situations, as well as near the sea, in the south part of Jamaica. The late Mr. Aiton gave us a specimen from Kew garden, in 1783, as a great rarity. This is, of course, more tender than the former, from which it differs in the ovate, somewhat deltoid or cordate, form of the leaves, one of which is exhibited by Dillenius in his t. 47. f. 3. The flowers too are rather smaller.

MELANCHOLY. See MENTAL Derangement.

MELANCRANIS, in Botany, from $\mu\epsilon\lambda\alpha\nu\alpha$, blackness, and $\kappa\epsilon\phi\alpha\lambda\eta$, a head, alluding to the dark purplish spots with which the scaly roundish head of the flowers is besprinkled, and which give it a black aspect. Vahl. Enum. v. 2. 239.—Class and order, *Triandria Monogynia*. Nat. Ord. *Calamariæ*, Linn. *Cyperoidæ*, Juss.

Gen. Ch. Cal. Scales of a spike, imbricated every way, ovate, pointed, each subtending an oblong, compressed, two-ranked, nearly seven-flowered spikelet, of the same length. Perianth inferior, of two valves, shorter and narrower than the corolla. Cor. of one lanceolate valve, closely dotted with purple. Stam. Filaments three, linear, the length of the scales, whitish dotted with purple; anthers linear. Pisl. Germen oblong; style solitary, smooth, cloven; stigmas simple. Seed one, without any bristles at its base.

Ess. Ch. Scales chaffy, imbricated every way. Spikelets solitary at every scale, many-flowered, two-ranked. Calyx of two valves. Corolla of one valve. Style cloven.

1. *M. scariosa*. Vahl. n. 1. (*Schoenus scarifolius*; Thunb. Prod. 16.)—Head oblong. Bractæas about three.—Native of the Cape of Good Hope. Root perennial. Stems in tufts, about a foot high, or rather less, thread-shaped, rigid, without joints, finely striated, angular at the top. Leaves shorter, brittle-shaped, channelled, dilated into a sheathing base. Head of flowers terminal, half an inch in

length, oblong, composed of imbricated, ovate, broad, membranous, rather rigid, smooth, shining scales, each a little spreading at the point, and tapering into a sort of awn; the three lower ones barren, tipped with a bristle-like leaf or bractea, which in the lowermost is three inches long. Spikelets five-flowered.

2. *M. radicata*. Vahl. n. 2.—Head nearly globose. Bractæas numerous.—From the same country. Perennial. Rather taller than the first. Bractæas, or barren scales, at the base of the head of flowers, from six to eight, one of them half an inch long, the rest gradually less, widely spreading, awl-shaped, rigid and somewhat pungent. Head the size of a cherry, composed of innumerable, ovate, crowded spikelets; these accompanying scales striated and dotted with purple.

MELANCTHON, PHILIP, in Biography, an illustrious reformer, and coadjutor of Luther, was born at Bretten, in the Palatinate upon the Rhine, on the 16th of February 1497. His family name, in the German language, literally meant "Black Earth," which was exchanged for Melancthon, a word in the Greek tongue having the same signification. He received the early part of his education at his native place, was afterwards placed under the care of a private tutor, and then proceeded to the college of Pfortsheim, where he obtained the friendship of the learned Reuchlin, from whom he received the Greek name already alluded to, by which he is generally known. In 1509 he removed to Heidelberg, where he made so rapid a progress in the classics and other branches of literature, that before he had completed his fourteenth year he was entrusted with the tuition of the sons of count Leonstein. He is accordingly celebrated by Ballet, in his "Historical Treatise of young Men who became famous by their Study or Writings." At the age of thirteen he wrote a comedy, which he dedicated to his friend and patron Reuchlin; and at that period he was employed to make the greatest part of the harangues and orations which were delivered in public, in the university of Heidelberg. In 1511 he was admitted to the degree of B.A.; but being refused his superior degree in the arts in the following year, he left the college, and entered himself at Tübingen. Here he pursued his studies with great diligence and success, and became himself a lecturer on the Latin classics. In 1513, before he had attained the age of seventeen, Melancthon was created doctor of philosophy. It was about this period that Erasmus paid him the following high compliment: "What hopes may we not entertain of Philip Melancthon, who, though as yet very young, and almost a boy, is equally to be admired for his knowledge in both languages? What quickness of invention!—what purity of diction!—what powers of memory!—what variety of reading!—what modesty and gracefulness of behaviour!" While at Tübingen, Melancthon diligently studied the sacred Scriptures, and always carried about with him a bible, which he had received as a present from Reuchlin. This treasure, it may be said, he bound to his heart; he was hardly ever seen without it; and, during divine service, he frequently referred to its contents; and on this account, those who were jealous of his rising fame endeavoured to excite prejudices against him, by insinuating that he spent his time at church in reading what did not belong to the solemnities of the service. In 1518 he was appointed by the elector of Saxony professor of the Greek language in the university of Wittenberg, and by his inaugural speech excited the highest applause and admiration. He now began to read lectures upon Homer, and the Greek text of the Epistle of St. Paul to Titus, which attracted vast crowds of auditors, and which contributed, in no small degree, to

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promote the study of Greek literature. In the year 1519 he published his "Rhetoric;" and in the following year, a treatise on "Logic;" and four years after this, his work on "Grammar." From the time of his settling at Wittenberg, Melancthon contracted a close intimacy with Luther; and in the year 1519 he accompanied him to Leipzig, to be a witness of his ecclesiastical combat with Eckius. He seems not to have been contented to be a mere bystander, but joined so much in the debate as to provoke the rage and bitterness of Eckius, who found himself completely overwhelmed with the arguments brought against the cause, which he undertook to justify and defend. Melancthon, from this moment, became an advocate in the cause of reform, and, by the services which he afterwards rendered it, made his name immortal. In the year 1520 he delivered a course of lectures at Wittenberg on the Epistle to the Romans, with which Luther was so highly pleased, that he caused it to be printed, and prefixed a preface of his own, recommending it to the use of the churches. In the following year he undertook a defence of the doctrines of Luther, in opposition to the university of Paris, which had passed a sentence of condemnation upon them. The next business of importance in which he was engaged, was to draw up, conjointly with Luther, a system of laws relating to church government, public worship, the ranks, offices, and revenues of the priesthood, and other matters of a similar nature, which John, elector of Saxony, promulgated in his dominions, and which was adopted by the other princes of the empire, who had renounced the papal supremacy and jurisdiction. After this, Melancthon was commissioned, with others, to visit all the churches in the electoral dominions, for the purpose of seeing these laws carried into execution.

In the year 1529, Melancthon accompanied the elector John to the diet at Spire, in which the princes and members of the reformed communion acquired the denomination of Protestants, in consequence of their protesting against a decree, which declared unlawful every change that should be introduced into the established religion, before the determination of a general council was known. In the year 1530 a diet of the empire was appointed to be held at Augsburg, with a view to put an end to the dissensions occasioned by religious disputes, under the eye of the emperor, in order that he might be able to form a clear idea of the real opinions of the reformers, and of the true causes of their opposition to the Roman pontiff. The Protestant princes employed Melancthon to compose a creed, which was presented to the emperor, and which reflects honour on the address, moderation, and eloquence of Melancthon. This creed, commonly known by the name of the "Confession of Augsburg," was severely animadverted upon by his opponents, which led him to draw up an able reply, notwithstanding the imperial prohibition, under the title of "A Defence of the Confession of Augsburg." Recourse was now had to conferences, in which our reformer mightily distinguished himself. It was in these that the spirit and character of Melancthon appeared in their true colours; and it was here that the votaries of Rome exhausted their efforts to gain over to their party this pillar of the reformation, whose abilities and virtues added a lustre to the cause in which he had embarked. His gentle spirit was apt to sink into a kind of yielding softness, under the influence of mild and generous treatment. Accordingly, while his adversaries soothed him with fair words and flattering promises, he seemed ready to comply with their wishes; but when they so far forgot themselves as to make use of threats, then Melancthon appeared in a very different point of light: then a spirit of intrepidity, ardour, and in-

dependence animated all his words and actions, and he looked down with contempt on the threats of power, the frowns of fortune, and the fear of death.

As every attempt at reconciliation had proved in vain, a severe decree was issued by order of the emperor, enjoining the princes, states, and cities, that had thrown off the papal yoke, to return to their duty, and their allegiance to Rome, on pain of incurring the indignation of the emperor, the patron and protector of the church. This at first oppressed the gentle spirit of Melancthon, till he was encouraged and animated by the exhortations of Luther; and he soon had the satisfaction to see the Protestant interest strengthened and extended, owing to the treaty concluded at Nuremberg, of the expediency of which the emperor was made fully sensible, by the league of Smalkalde, and other circumstances. Melancthon's fame was now spread far and wide, and he was invited by Henry VIII. to settle in England, and, about the same time, by Francis I. to take up his abode in France, with the view of employing him to pacify, or at least to moderate the disputes which had arisen there concerning religion, and to advise with the French divines about restoring the ancient discipline of the church. Melancthon felt inclined to accept the latter invitation; but the elector of Saxony would not by any means give his consent, knowing that by such a step he would expose himself to the resentment of the emperor, between whom and Francis affairs began to wear a hostile aspect. In 1541 Melancthon was at the famous conferences at Ratisbon; and in 1543 he went to Cologne, to assist the elector in introducing the reformed religion into his diocese; but the main design of his journey was frustrated, through the opposition of the canons and other divines of the see: nevertheless the elector of Cologne and the elector palatine embraced the Protestant faith. In 1548 he assisted at seven conferences on the subject of the interim of Charles V., and published a censure on that interim, and all the writings presented at these conferences. In 1551, pope Julius III. having consented to the assembling a council at Trent, the Saxon Protestants employed the pen of Melancthon, and the people of Wittenberg that of Bredlius, to draw up confessions of their faith, to be laid before the council. Soon after, the Saxon divines, with our reformer at their head, received directions from Maurice, now elector of Saxony, to set out towards Trent, but were secretly instructed to stop at Nuremberg, as Maurice had no intention to submit to the emperor's views, and the schemes which he had been long preparing, with the deepest policy, for maintaining the rights and liberties of the German empire, and the security of the Protestant faith, and which were on the eve of being carried into execution. While he was at Nuremberg, in 1552, Melancthon received intelligence of the complete success which had crowned Maurice's well-projected undertaking, and compelled the emperor to conclude the famous pacification at Passau, commonly called "The Peace of Religion."

Upon this event he intended to have returned to Wittenberg, but as that city was then infected with a plague, the university had been removed for a time to Torgau, where Melancthon discharged the duties of his professorship, till the infectious disorder was completely banished. To these duties he devoted the remainder of his life, as well as in the composition of various works, and the carrying on of controversies with his Protestant and Catholic opponents. His last conference was with the doctors of the Romish communion at Worms. The first point discussed was concerning the rule of judgment in the church, which the Catholics maintained to be perpetual consent or custom;

but the Protestants, in conformity with their own principles, held it to be the prophetic and apostolical writings. In the next place the Catholics demanded a decree of condemnation against the followers of Zuingle, and others, when the deputies of Jena perceiving the disposition of the majority to agree to this demand, broke off the conference, by seceding from the meeting; and thus the object of the Papists to promote a division among the Protestants was effectually gained. From Worms, Melancthon went to Heidelberg, at the request of Otho Henry, elector palatine, for the purpose of giving his advice in forming the constitutions of an academical institution established in that city. In 1559 he made an attempt to bring over the Greek churches to embrace the doctrine and discipline of the Lutheran church, and to live in religious communion with the Protestants; in which his laudable endeavours were ineffectual. He died in the following year at Wittenberg, in the sixty-fourth year of his age, and was interred near the remains of Luther. "Nature," says one of this great man's biographers, "had given Melancthon a peaceable temper, which was but ill suited to the time he lived in. His moderation served only to be his cross. He was like a lamb in the midst of wolves. Nobody liked his mildness: it looked as if he were lukewarm." He was a person of the middle stature, with lively eyes and well-proportioned limbs, but his constitution was delicate and his health weak, yet by the exercise of the most rigid temperance, he was enabled to pursue his studies with an intenseness of application that is almost incredible. The habits of such a man cannot fail of interesting those who reflect on what he did for the world: it was his practice to go to bed immediately after an early supper, and to rise at midnight to his labours. On retiring to rest he endeavoured to dismiss as much as possible from his mind every thing that could tend to disturb his repose, and for this purpose he always postponed reading such letters as were brought to him in the evening till next day. He was civil and obliging to all; entirely free from envy, detraction, jealousy, and dissimulation; and possessed an unrivalled degree of candour and frankness. His principal relaxation from severe studies was the conversation of his friends during his meals. He was humble and extremely disinterested, constantly refusing the valuable presents which were offered him by many great princes, and contenting himself with the small profits of his professorship; yet he managed his narrow income with such admirable economy, that he was able to indulge his benevolent and charitable disposition to an astonishing degree. According to the testimony of Mosheim, few worthies can be compared with him, if we consider the extent of his knowledge, the fertility and elegance of his studies, the facility and quickness of his comprehension, or the uninterrupted industry that attended his learned and theological labours. He rendered philosophy and the liberal arts the same eminent service that Luther had done to religion, by purging them from the dross with which they had been corrupted, and by recommending them in a powerful and persuasive manner to the study of the Germans. He had the rare talent of discerning truth in all its connections and combinations, of comprehending at once the most abstract notions, and expressing them with the utmost ease and perspicuity. His love of peace, which was partly owing to the sweetness of his natural temper, made him desire with ardour, that a reformation might be effected without producing a schism in the church. The spirit of charity led him sometimes to make concessions that were neither consistent with prudence, nor advantageous to the cause in which he was engaged. But when the hour of real danger approached, when things wore a formidable aspect, and the

cause of religion was in imminent peril, then this mild and even timorous man, in an instant, as it were, was converted into a hero, looked danger in the face with unshaken constancy, and opposed his adversaries with invincible fortitude. Had his fortitude been more uniform and steady, his desire of reconciling all interests, and pleasing all parties less excessive, he must deservedly have been considered as one of the greatell among men.

In philosophy he followed chiefly the principles of Aristotle, and had frequently recourse to the doctrines of the Platonists and Stoics, but always in due subordination to revelation, and only so far as they were likely to answer some valuable purposes. "I would have no one," says he, "trifle in philosophising, lest he should lose sight of common sense; rather let him be careful, both in the study of physics and morals, to select the best things from the best sources. He may not, therefore, improperly be considered as an *eclectic*."

Melancthon was much assisted in the execution of his plans by the labours of many learned Protestant professors of the Germanic schools from Italy and Great Britain, who brought with them an attachment to the Peripatetic system, and wherever they were appointed public preceptors, made that system the basis of their philosophical instructions. From Wittenberg, Tübingen, and Leipzig, conducted after the plan which had been introduced by Melancthon, many learned men arose, who, becoming themselves preceptors, adopted the same plan of instruction, which, from Melancthon's Christian name, was denominated "The Philippic Method," and thus disseminated the Peripatetic doctrine, till at length it was almost every where taught in the German Protestant schools, under the sanction of civil and ecclesiastical authority. The number of the works which Melancthon published, considering how much he was engaged as a public man, is truly astonishing. The titles of a great many of them are given in the General Biography. They are theological, moral, and philosophical; some, however, relate to what is usually denominated the *Belles Lettres*, and others are illustrative of various classical authors. The most complete edition was published by the author's son-in-law, Jasper Peucer, in the year 1601, in 4 vols. fol.

This celebrated and mild reformer, the friend of Martin Luther, and author of the confession of Augsburg, &c. wrote upon music. He composed his own epitaph, and died in 1560.

"Iste brevis tumulus miseri tenet ossa Philippi,
Quis, qualis fuerit nescio, talis erat."

MELANES, or MELAS, in *Ancient Geography*, a gulf that lay between the Chersonese of Thrace to the S.E., and a part of the continent to the N.W. It is now called the "gulf of Megarissa."

MELANI MONTES, a chain of mountains, placed by Ptolemy in Arabia Petræa, supposed by Jerome to be those that are called in scripture Sinai and Oreb.

MELANI, ALESSANDRO, in *Biography*, the composer of an opera, which was extremely applauded at Bologna, Florence, and in many other theatres of Italy, in 1697, called "Il Carcierier di se stesso."

MELANIPPIDES, a Greek poet and musician, who flourished about the sixtieth olympiad, and whose poetry and music rendered him famous. He had a grandson of the same name, who was likewise a great musician; though Plutarch, in a croaking fit, accuses him of having been one of the first corrupters of the ancient music, by the innovations which he introduced. See TIMOTHEUS.

MELANITE. See GARNET.

MELA.

MELANIUM, in *Botany*, from *μελας*, *black* or *dark*, *μελανιον* being a name for the purple violet. It is applied by Browne, in his History of Jamaica, p. 215, to a small weak Jamaica plant, with a peculiarly disagreeable and pungent smell, which Linnæus referred to LYTHRUM. (See that article,) by the name of *L. Melanium*. Sp. Pl. 641. Swartz. Obs. 193. The author last mentioned says the flowers are purple; and this accounts for the name, for the application of which Browne, as usual, gives no reason.

MELANOGÆTULI, or NIGRITÆ, or *Black Gætulians*, in *Ancient Geography*, a people of Africa, placed by Ptolemy between the mountains Sagapola and Ufargala, in a district S.E. of Gætulia Propria, to which it is contiguous, and N. of the river Niger. (See GÆTULIA.) The Melanogætuli were a people without doubt different from the Gætulians, and so considered by Ptolemy, though Cellarius insinuates that they were a tribe of that people. Their complexion not only evinces this fact, but likewise shews, that their progenitors were different from those of the Gætulians. The modern district of Wad-reag, in the province of Constantina, containing a collection of twenty-five villages ranged in a N.E. and S.W. direction, corresponds with a part of the country of the Melanogætuli, according to Dr. Shaw. Our learned traveller likewise supposes, that the country of the Beni-Mezzab, situated 35 leagues to the S. of the mountains of the Ammer, supposed to be part of the Mons Pharaeus of Ptolemy, the large village of Engoufah, 30 leagues to the S.W. by W. of Tuggart, the capital of Wad-reag, and the populous city of Wurglah, with their dependencies, even to the banks of the Niger, were included in Melanogætulia. As Ptolemy places the Melanogætuli next to the Pharusii in a southern direction, fixing his Nigritian Ethiopians in a tract lying to the north of the Niger; and as Mela, Pliny, and Strabo give the Nigritæ exactly the same situation with regard to the Pharusii and the Niger, but are quite silent as to the Melanogætuli; it is very probable, that the Melanogætuli and Nigritæ were the same people. If this supposition be admitted, it will appear very credible, that their territories extended to the Niger, and that they had some remarkable places in those parts; since, according to Ptolemy, many towns stood not far from that river, of which the principal were Passide, Saluce, Negira, Thige, Cuphe, Thammdicana, and Vellegia. The most celebrated rivers of this part were the Gir and Niger. If any credit be given to Leo and the African historians, Sabtecha, the son of Cush, first peopled the Sahara, between the mountains of Atlas and Nigritia, and therefore probably Nigritia itself, or at least part of it. From the same author it appears, that the various Nigritian dialects bear an affinity to the Chaldee, Arabic, and Egyptian tongues; and consequently to the Ethiopic, which does not differ widely from them. The Carthaginians had undoubtedly some knowledge of the Nigritæ, since it appears probable from Frontinus, that one part of their army consisted of Nigritian troops. This circumstance will enable us to account for several antique coins with a Negro's or Nigritian's head upon them. The Nigritæ used chariots in their wars, and were armed after the manner of the western Ethiopians with bows and arrows, as we learn from Strabo. According to the same author, the Pharusii, and therefore, probably, the Nigritæ, travelled in caravans through the deserts to Cirta, and kept open a communication with the Maurusii. On these occasions they carried bottles filled with water, tied to their horses' bellies, lest they should perish from thirst in the vast deserts through which they were obliged to traverse. Hence it is undeniably clear, that these Pharusian and Nigritian mer-

chants lived at a great distance from Cirta, and those places of Mauritania to which they resorted; and also that the Negroes or Blacks held an early correspondence with the ancient Mauritanians, Numidians, and Carthaginians. Anc. Un. Hist. vol. xvi. 8vo.

MELANOSCHOENUS, in *Botany*, from *μελας*, *μελανος*, *black*, and *σχονος*, *a rush*, Mich. Gen. 46. t. 31, is *Schoenus mucronatus* of Linnæus. See SCHOENUS.

MELANO-SYRI, in *Ancient Geography*, a name given to those who inhabited Syria, between the Euphrates and the Mediterranean sea, by way of contradistinction to the *Leuco-Syri*, who lived in Cappadocia, towards the Euxine sea. The former are black Syrians, and the latter white, as their respective appellations import.

MELANTHIUM, in *Botany*, so called by Clayton, from *μελας*, *black* or *dark*, and *ανθος*, *a flower*; but the first word is here taken in a wider sense than is usual, even in its application to flowers; for the plant of Clayton, *M. virginicum*, Linn. Sp. Pl. 483, has a dull yellowish, lurid, but not black, hue. This plant is probably a *Veratrum*; but several others, more remarkable for the darkness of their flowers, have been referred to the genus before us, which now rests upon them. It must not be supposed however that any of these is the *μελανθιον* of the ancient Greeks, for the description in Dioscorides, more particular and expressive than usual, evidently indicates the *Nigella fativa*, the name being applied by a metastasis to the flower, which is white, the seeds, for which the plant was known and cultivated, being intensely black. Sometimes indeed the plant was, for this last reason, called *μελασπιριμον*. Our present business is with the Linnæan *Melanthium*, as far as we can define its limits. Linn. Gen. 179. Schreb. 240. Willd. Sp. Pl. v. 2. 266. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 326. Juss. 47. Lamarck Illustr. t. 269. Thunb. Prod. 67. (Wurmbea; Thunb. Nov. Gen. 18. t. 1. Schreb. 239. Willd. Sp. Pl. v. 2. 265. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. ed. 2. v. 2. 325. Lamarck Illustr. t. 270.)—Class and order, *Hexandria Trigynia*. Nat. Ord. *Coronarie*, rather *Tripetaloides*, Linn. *Junci*, Juss.

Gen. Ch. *Cal* none, unless the corolla be taken for such. *Cor.* of six petals, sometimes contracted, sometimes combined, at the base, inferior, ovato-lanceolate, acute, spreading, equal, permanent. *Stam.* Filaments six, thread-shaped, erect, the length of the corolla, more or less attached to it, permanent; anthers globose. *Pist.* Germen superior, nearly globular; styles three, spreading, thread-shaped, the length of the stamens, recurved at the extremity, permanent; stigmas simple. *Peric.* Capsule ovate, with three furrows, three cells, and three valves, crowned with the styles. *Seeds* numerous, roundish.

Ess. Ch. *Calyx* none. *Petals* six, equal, bearing the stamens. *Styles* permanent. *Capsule* of three cells, with many seeds.

Obs. The found Linnæan rule, that "the genus should give the character, not the character the genus," induces us to follow Linnæus, and even Thunberg himself, the original establisher of *Wurmbea*, in reducing that genus to *Melanthium*, from which it differs merely in the combination of its petals at their base into an angular tube, a character which, by a comparison of all the species together, will appear of no essential consequence in this case. Mr. Salisbury's *Ornithoglossum*, received into Ait. Hort. Kew. ed. 2. v. 2. 327. (*Melanthium viride* of Linnæus and Thunberg), however alike to many of the species at first sight, does so materially differ, in having the stamens inserted into the receptacle, and, like the styles, deciduous, to say nothing of other characters, that we cannot well retain it here. (See

MELANTHIUM.

ORNBITHOLOSUM.) Neither are we at all certain that some of the following may not require to be placed elsewhere. *M. latum*, Willd. Sp. Pl. n. 3, is now properly referred to *Habanaria*, by Mr. Ker in Curt. Mag. t. 83.

1. *M. flavum*. Siberian Grassly Melanthium. Linn. Sp. Pl. 483. (Melanthium; Linn. Am. Acad. v. 2. 34.) t. 4. f. 11. Ornithogolum; Gmel. Sib. v. 1. 45. t. 8.)—Flower pointed. Petals combined at the base. Capsule pointed. Leaves linear.—Native of mountainous woods in Siberia, where it was gathered by Gmelin, flowering in July. We have never seen a living specimen. The root is bulbous, perennial, oblong, white. Stem slender but firm, erect, one or two feet high, nearly leafless, glaucous when young, terminating in a length, somewhat compound, bracteated panicle, of greenish-white small flowers, whose petals are reflexed. Capsule half an inch long, erect, ovate, pointed, purplish, sheathed at the bottom by the combined dilated bases of the petals, and crowded with the recurved styles. It bursts in the furrows, from the top nearly to the bottom.

2. *M. capense*. Spotted-flowered Melanthium. Linn. Sp. Pl. 483. Thunb. Prod. 67.—Flowers racemose. Petals dotted, contracted at their base. Leaves ovate-lanceolate, with a broad sheathing base.—Native of the Cape of Good Hope. Root an ovate bulb. Stem two or three inches high, with a few broad, spreading, pointed leaves, and a short terminal cluster of spotted flowers, whose stamens cohere but slightly with the petals. We find no figure of this species.

3. *M. junceum*. Rush-like Melanthium. Jacq. Ic. Rar. t. 451. Curt. Mag. t. 558. Willd. Sp. Pl. n. 7. (*M. triquetrum*; Linn. Suppl. 213.)—Leaves linear-awl-shaped, the upper ones dilated and concave at the base. Spike zigzag. Petals contracted at the bottom.—Native of the Cape. It flowers in the green-house early in the spring, like other bulbs from the same country, and indeed resembles an *Ixia* in its spike of purplish flowers, the bases of whose petals are marked with a double violet spot. The leaves are glaucous, rather succulent, and the uppermost are remarkable for their tumid or inflated figure, just above their insertion.

4. *M. ciliatum*. Fringed Melanthium. Linn. Suppl. 213. Thunb. Prod. 67.—Leaves ovate, spreading, finely fringed with cartilaginous teeth. Spike zigzag. Petals much contracted at the bottom.—Native of the Cape; we find no traces of it in the English gardens. The habit is like an *Orchis*, the lower part of the stem bearing two or three broad, ovate, spreading leaves, with a sheathing base, their edges minutely fringed. Spike rather dense, of many sessile flowers, spreading every way, whose petals are elliptic-oblong, with a considerable claw, and appear to be white, minutely streaked or dotted with purple or red.

5. *M. secundum*. Single-ranked Melanthium. Lamarck Dict. v. 4. 28. Illustr. t. 269. f. 2. Willd. Sp. Pl. n. 8.—Leaves linear. Spike inclined one way. Petals contracted at the bottom, with a tooth at each side.—Native of the Cape, where it was gathered by Sonnerat and by Bladh. The younger Linnæus confounded it with the last in his herbarium, and apparently in his Supplement. The present however is abundantly distinguished by its narrow erect leaves, and especially by a remarkable tooth at each side of the petals, just above their claw or contraction, well observed by DeFrouffieux in Lamarck. It seems doubtful to us whether the unilateral direction of the flowers be not an effect of drying. They are white or bluish-coloured, dotted like the foregoing.

6. *M. indicum*. Indian Melanthium. Linn. Mant. 226.

—Leaves linear. Flowers corymbose. Petals linear-lanceolate, tapering at the base.—Sent by Koenig from Pondicherry.

This has much the habit of *Ornithogolum luteum*. The leaves are very narrow, erect, and rise above the stem, which bears a sort of leafy or bracteated corymb of a very few upright flowers. The narrow and sharp petals are of a dark purple, as well as the stamens and style. We think, with Willdenow, that there is a connection between the filaments and petals, especially as there is but a simple row of six sears at the base of the ripening germen, after the flower has fallen, which indicates that the stamens have no separate insertion there. The styles are permanent, even on the ripe capsule. Nevertheless the whole aspect of the plant is so nearly allied to that of *M. viride*, (Mr. Salisbury's *Ornithoglossum*;) as almost to shake our faith in that genus.

7. *M. flavum*. Yellow Melanthium. (*M. uniflorum*; Jacq. Ic. Rar. t. 450. Coll. v. 4. 100. Curt. Mag. t. 767. Ant. Hort. Kew ed. 2. v. 2. 327. Willd. n. 12. *M. æthiopicum*; Herb. Linn. Lamarck Dict. v. 4. 29. Tulipa Breyntiana; Linn. Sp. Pl. 438. Willd. Sp. Pl. v. 2. 98. Thunb. Prod. 65.)—Leaves linear-lanceolate, sheathing. Flowers somewhat spiked. Petals elliptic-lanceolate, tapering at the base. Stamens united to the petals more than half way up. Germen and capsule columnar.—Native of the Cape, where it was gathered by Thunberg. It is impossible to retain the name *uniflorum* for this species, which, as Mr. Ker observes, is altogether fallacious. We have therefore ventured to translate the English appellation, given by him, and adopted by the learned authors of the Hortus Kewensis. We would have called it *Breyntianum* after Linnæus; but the synonym of Breyntius seems very evidently to belong to something else; we pretend not to say what. In this difficulty, sense is surely preferable to the mere records of confusion and mistake. The stem is from a span to a foot high. Leaves spreading, keeled and sheathing at the base. Flowers from two to six, in a close zigzag spike; very rarely solitary only. The petals are yellow on the upper side; brownish crimson beneath. In the dried specimen this last-mentioned colour runs into minute oblong spots, which induces a suspicion that the dotted appearance in some of the former species, known to us in a dry condition only, may not exist in the fresh flowers. The base of each petal in that now under consideration tapers down into a long dark-red claw, to which each filament, of the same colour, is firmly united for three-fourths of its own length. The germen is remarkably columnar, with three longitudinal furrows. Styles very short, thick, and recurved. Anthers oblong.

8. *M. eucomoides*. Dwarf Green Melanthium. Jacq. Ic. Rar. t. 450. Curt. Mag. t. 641.—Leaves ovate-oblong, spreading, sheathing at the base. Stalk with few flowers, shorter than the leaves. Base of the petals concave, with a tooth at each side.—Native of the Cape; rarely seen in England. This is very unlike any of the former, being of a dwarf habit, with several broad, sheathing, long, spreading leaves, recurved at their points. Among these stands a short stalk, bearing one, two, or three large green flowers, of a singular and not beautiful appearance. The long bases or claws of the petals are rolled in at their sides, and crowned with a pair of broad blunt teeth, analogous to those described in our fifth species. Filaments united to the claws. Anthers oblong, yellow, brown at the back. Germen oval, with three deep furrows. Styles awl-shaped, slightly recurved at the top.

9. *M. pumilum*. Little Rigid Melanthium. Forst. Comm. Gött. v. 9. 30. t. 6. Willd. n. 14.—Leaves lanceolate, rigid,

rigid, channelled, sharp-pointed, bearded at the base. Stalk with few flowers, shorter than the leaves.—Native of Terra del Fuego. By one of Forster's specimens in our possession, this appears to be a mountain plant, of a dwarf-tufted habit; having numerous, crowded, spreading, radical leaves, an inch long, ovato-lanceolate, rigid, pungent and rough-edged; channelled above, keeled beneath; their sheathing bases densely invested with long, white, shining, pellucid hairs. The flowers are said to be white; in a dry state they have a purplish tinge. They are about three or four, each supported on its own short stalk. Petals not contracted at the base. Styles, according to Willdenow, (from whom we adopt the reference to Forster,) none; the stigmas three, rarely six.

Willdenow justly observes that *M. luteum*, Thunb. Jap. 152, is probably distinct from *Veratrum luteum* of Linnæus. Having seen no specimen, by which we might judge of its genus, we decline admitting it here.

MELANURUS, in *Ichthyology*. See SPARUS *Melanurus*.

MELAONES, a word used by certain authors for a black kind of worm found in meadows in the month of May, which, when bruised, emits an agreeable smell. Some also have called a small species of beetle by the same name.

MELAPARA, in *Geography*, a town of Bengal; 10 miles E.N.E. of Dacca.

MELAS, in *Ancient Geography*, the name of several rivers; e. g. a river of the Peloponnesus, in Achaia:—a river of Bœotia, which had its source seven stadia from Orchomené, and discharged itself into the lake Cephissus:—a river of Thessaly, near Heraclea:—a river of Mygdonia:—a river of Thrace:—a river of Asia, whose source was near the town of Cæsarea ad Argæum:—a river of Asia, in Pamphylia:—a river of Asia, in Armenia Minor.

MELAS, *μελας*, in *Medicine*, signifying literally *black*, is a term applied by the ancients to a disease of the skin, which appears to be a variety of the scaly lepra; differing principally in the colour of the eruption from the more common form, which is white, and which was called *Alphos*, or *Leuce*. (See these articles.) The *leuce*, however, as we have there shewn, in strictness, ought not to be confounded with *alphos*, or put under the same genus with it and the *melas*; since all the ancients, even Celsus, who has ranked all three under the head of *vittiligo*, distinctly pointed out the essential difference of the *leuce*. See Celsus, lib. v. cap. 27. sect. 19. See also LEPROSY.

MELASICTERUS, from *μελας*, *black*, and *ικτερος*, *icterus*, the *jaundice*, a term which has been applied by some writers to that severe and inveterate degree of jaundice, which has been also termed in English the *black jaundice*. (See JAUNDICE.) Sauvages, Nofol. Method. class. ix. genus 12.

MELASMA, in *Botany*, so named by Bergius, from *μελας*, *black*, apparently because the herb assumes that colour in drying. Thunberg, who likewise established it as a genus, called it *Nigrina*, for the same reason. The younger Linnæus referred it to GERARDIA (see that article); to which Thunberg, in his Prodrum 106, accedes, and the plant stands there, as well as in Willd. Sp. Pl. v. 3. 222, under the name of *Gerardia Nigrina*. (*Melasma scabrum*; Berg. Cap. 162. t. 3. f. 4.)—Herb rough. Leaves lanceolate; serrated in their lower part. Stem square.—Native of the Cape of Good Hope. The stem is herbaceous, above a foot high, leafy, somewhat branched. Leaves opposite, narrow, about two inches long, rough on both sides, with prominent points. Flowers axillary and terminal, on long stalks, drooping, large. Nothing is recorded concerning

their colour. Every part of the dried plant is as black as ink.

MELASMA, (from *μελας*, *black*), in *Surgery*, a black and dark blue, or livid, discolouration of the skin, more commonly termed by surgeons an *ecchymosis*; which see.

MELASPHÆRULA, in *Botany*, is denominated by Mr. Gawler, now Ker, who first established the genus, from *μελας*, *black*, and *σφαιρα*, *a ball*, in allusion to the little black and shining globular bulbs, said to be produced at the ramifications of the stem, as in several lilies, the *Dentaria bulbifera*, *Saxifraga bulbifera*, and others. These however have not been observed on the cultivated *Melaspheerula* in England or France, but Jacquin delineates them. Ker in Sims and Kon. Ann. of Bot. v. 1. 231. Curt. Mag. v. 17. 615. Ait. Hort. Kew. ed. 2. v. 1. 103. (Diasia; Decand. in Bulletin des Sciences, n. 80. Brumaire an. 12.)—Class and order, *Triandria Monogynia*. Nat. Ord. *Enfate*, Linn. *Irides*, Juss.

Gen. Ch. Cal. Spatha inferior, shorter than the corolla, of two oblong, acute, permanent valves; the outermost broadest. Cor. of one petal, superior; tube none; limb irregular, two-lipped, somewhat bell-shaped, divided to the bottom into six ovate, bristle-pointed, spreading segments, the three lower ones most coloured, and rather the smallest. Stam. Filaments three, close together, shorter than the corolla, and ascending under the middle segment of its upper lip, recurved at the summit; anthers oblong, incumbent. Pist. Germen inferior, three-lobed, depressed; style thread-shaped, of the length and situation of the stamens; stigmas three, spreading, simple, bluntish. Peric. Capsule three-lobed, depressed, thin, of three cells and three valves, opening at the upper side. Seeds few, globose, without wing or border.

Eff. Ch. Spatha of two valves. Corolla two-lipped, in six deep, nearly equal, bristle-pointed segments; without any tube. Stigmas three, recurved. Capsule three-lobed. Seeds globose.

M. graminea. Grass-leaved *Melaspheerula*. Curt. Mag. t. 615. (Diasia iridifolia; Redout. Liliac. t. 54. Gladiolus gramineus; Linn. Suppl. 95, excluding the synonyms. Willd. Sp. Pl. v. 1. 221. Jacq. Ic. Rar. t. 236. Andr. Repof. t. 62.)—Gathered by Sparrmann and Thunberg at the Cape of Good Hope. Mr. Masson sent it to Kew in 1787, where it blossoms in the green-house during most part of the year. The root is a small, coated, roundish bulb. Stem near two feet high, slender and rigid like that of a grass. The leaves also are of a grassy habit, pale green, long and narrow. Flowers numerous, in a lax and slender panicle, scentless, small, compared with many of the same tribe. Spatha green, with a filmy edge. Corolla of a pale greenish-yellow, each segment marked with a purplish-brown, central line, or rib, of which those in the three lower segments are broadest and most conspicuous, evincing the natural irregularity of the flower. The seeds are brown.

No other species is known. Redouté distinguishes this, after Decandolle, into two, according to the various length and uprightiness of the foliage, but, as it seems to us, without sufficient reason.

MELASSES. See MOLASSES.

MELASSO, a town of Asiatic Turkey, in Natolia, anciently called "Mylasa," or "Mylassa." It is situated on a fertile plain near a mountain, which furnishes a great quantity of fine white marble. It had formerly a temple dedicated to Augustus Cæsar, with twenty-two columns, six of which were in front; and it was adorned with so many temples and public buildings, that a certain musician, on entering the *αγορα*, or market-place, to make a proclamation,

on, used the words *ἄνοι ἄνοι*, hear ye temples, instead of *ἄνοι ἄνοι*, hear ye people. Under the Roman it was a free city. It is now a large place, containing a great number of houses, though they are mean. The air is accounted bad, and scorpions abound; 85 miles S. of Sayrua. N. lat. 37° 10'. E. long. 27° 45'.

MELASTOMA, in *Bany*, a very extensive tropical genus of plants, most remarkable for the transcendent beauty and peculiarity of its foliage. The name was composed by John Burmann, of *μαλ*, *black*, and *στομα*, *the mouth*; being synonymous with the Portuguese appellation of one of the Ceylon species, *Bacca pinto*, or Black Mouth, which arose from the effect of the fruit upon the lips of those who eat it. Some of the West Indian species are known by the name of American Gooseberries.—Burm. Zeyl. 156. Linn. Gen. 217. Schreb. 293. Willd. Sp. Pl. v. 2. 581. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 45. Juss. 329. Lamarek Dict. v. 4. 31. Illustr. t. 391. Gartin. t. 126. Aubl. Guian. 402—437. Swartz. Ind. Occ. 764—822. (Acinodendron; Linn. Gen. ed. 1. 129. Tococa; Aubl. Guian. 437. Fothergilla; ibid. 440. Mayeta; ibid. 443.)—Clas and order, *Dicandria Monogynia*. Nat. Ord. *Calycanthemae*. Linn. *Melastomeae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, four or five-cleft, swelling at the base, permanent. *Cor.* Petals four or five, roundish, inserted into the rim of the calyx. *Stam.* Filaments eight or ten, short, inserted into the calyx; anthers very long, terminal, somewhat curved, of one or two cells, opening by an oblique terminal pore, and often accompanied by a pair of small spreading scales at the base. *Pist.* Germen roundish, in the bottom of the calyx; style thread-shaped, declining; stigma blunt or capitate. *Peric.* Berry of two to five cells, roundish, coated with the body of the calyx, and crowned with its permanent annular rim. *Seeds* very numerous, imbedded in pulp.

Ess. Ch. Calyx four or five-cleft, bell-shaped. Petals as many as the segments of the calyx, inserted, with the filaments, into its rim. Anthers beaked, opening at the tip. Berry of five cells, invelled with the calyx.

Only fifteen species of this genus are defined in the 14th edition of the *Syistema Vegetabilium* of Linnæus, but the discoveries of Swartz, and of various correspondents of sir Joseph Banks, in the West Indies, and of Aublet in Guiana and Cayenne, have very greatly increased that number, so that Willdenow describes eighty-five, notwithstanding his having referred some species of the above authors to *Rhexia*. We are possessed of a few that do not appear in Willdenow's list. The whole are distributed into various sections, distinguished by the number of stamens, which differ in different species from ten to eight or twelve; and the petals and segments of the calyx also from five to four or six. Subordinate characters of each section depend on the number and connection of the longitudinal ribs of the leaves, which, throughout the whole genus, are very remarkable, and in some form, together with the transverse veins, the most elegant appearance imaginable. The leaves in all are opposite and simple, their two sides generally different in colour and pubescence, the under one being often downy, rusty, or silky. Stem shrubby. Flowers numerous, axillary, or more generally terminal; their petals rarely yellow, usually red, purple, or whitish; with, for the most part, yellow very handsome anthers. We shall select examples of each section, marking the species by Willdenow's numbers.

Sect. 1. *Stamens* twelve. Three species in Willdenow.

1. *M. calyptrata*. Vahl. Eclog. v. 1. 40. Lamarek Dict. v. 4. 51?—Leaves elliptic-lanceolate, tapering, three-

ribbed, smooth, slightly and minutely toothed. Flowers panicled. Native of the island of *M. calyptrata*. Petals terminal, oval, four inches long; its branches spreading, the lowermost four together, the rest opposite, smooth; their ultimate divisions divaricated, three-flowered. Flowers stalked, covered with an acute conical lid, falling off all round and deciduous. *Calyx* abrupt, the size of a corn-cob seed. *Petals* yellow. Vahl.—The late Dr. Dancer sent us from Jamaica a specimen which answers to the above characters, except that the *flowers* seem fewer and larger. The teeth of the *calyx* are firmly united into a thick coriaceous conical lid, like that of an *Eucalyptus*, (see that article), which sometimes splits at the top, but more generally falls off entire, by an irregular circular separation from the body of the calyx. Within this are the *petals*. The *fruit* is crowned with a very narrow annular rim, quite distinct from the calyx.

3. *M. patens*. Swartz. Ind. Occ. 791.—Leaves with five or seven ribs, heart-shaped, hairy, somewhat toothed. Cluster terminal, spreading, bristly. Stamens twelve.—Native of the more lofty mountains of Jamaica, flowering in summer. The inhabitants call it the American Gooseberry. The *fruit* is sweet, but wants spirit. The *flowers* have rarely only ten *stamens*. It is a *shrub* eight or ten feet high, clothed with more lofty mountains of Jamaica, flowering in summer. The inhabitants call it the American Gooseberry. The *fruit* is sweet, but wants spirit. The *flowers* have rarely only ten *stamens*. It is a *shrub* eight or ten feet high, clothed with prominent, bristly, brownish-red hairs, and the branches are dark purple. *Leaves* varying in length from three to six inches, broad; green and bristly above; pale and downy beneath; ribs five or seven, besides the slender marginal ones, connected by a profusion of reticulated veins. *Footstalks* two or three inches long, bristly. *Clusters* three-forked, very bristly, with a pair of small leaves at each subdivision. *Flowers* large, with linear, bristly, elongated calyx-teeth, and whitish or flesh-coloured petals.

Section 2. *Stamens* ten; *leaves* with three separate ribs. Eighteen species in Willdenow.

5. *M. rigida*. Swartz. Ind. Occ. 768.—Leaves three-ribbed, minutely toothed, rigid, ovate, somewhat heart-shaped; roughish beneath. Clusters terminal, panicled, rough with dense rusty down.—Native of the Blue mountains of Jamaica; communicated by Dr. Dancer. A *shrub* 10' or 12 feet high; its *branches* obtusely quadrangular, compressed, rough at the extremities with dense, short, dark, rusty, somewhat starry, pubescence. *Leaves* from three to six inches long, on long rusty stalks, ovate, or slightly heart-shaped, rigid but brittle, pointed; smooth above; roughish, but of the same green colour, beneath; with three distant ribs, besides the marginal ones, and many parallel transverse veins. *Panicle* long, many-flowered, repeatedly three-forked, rusty. *Flowers* small, with white petals, each *calyx* subtended by a pair of long, awl-shaped, rusty, deciduous *bracteas*.

7. *M. montana*. Swartz. Ind. Occ. 766.—Leaves three-ribbed, very slightly toothed, nearly smooth. Cluster terminal; its branches deeply three-cleft, spreading. Petals obtuse. *Calyx* abrupt, with a deciduous lid.—Communicated by Dr. Swartz from the lofty mountains in the southern part of Jamaica. The *leaves*, *stalks*, and *calyx* are, in the dried plant at least, of a light yellowish-green, and every part is nearly, if not quite, smooth. *Flowers* small, white, their calyx-teeth combining to form a lid, as in the first species. The upper surface of the *leaves* is minutely granulated. Their lateral ribs are united, for a short space, to the middle one, so that they strictly come under the denomination of triply-ribbed. The marginal ones are distinct from the very bottom.

10. *M. aspera*. Linn. Sp. Pl. 560. (*M. foliis lanceolatis trinerviis scabris*; Linn. Zeyl. 76. n. 172. *M. scabra trinervia*;

MELASTOMA.

trinervia; Burm. Zeyl. 154. t. 72.)—Leaves ovato-lanceolate, three-ribbed, entire, rough with depressed bristles. Flowers in leafy clusters.—Native of Ceylon. We have a specimen from sir G. Staunton which answers well to Hermann's figure and description. These were mis-applied by Linnæus to his *oñandra*, as is well remarked by Retzius in his *fast.* 4. 25. In the Linnæan herbarium a specimen occurs marked *aspera*, which is not an original one, nor, in fact, different from *malabathrica* hereafter mentioned, except that the lateral ribs of the leaves are very small. *Katou Kadali*, Hort. Malab. v. 4. 91. t. 43, quoted for the present species, has strongly five-ribbed leaves, and numerous corymbose flowers, with an extremely hispid calyx. We cannot think it belongs here, and still less the *Fragarius ruber* of Rumph. Amboin. v. 4. 135. t. 71, whose flowers are described as small and white. Those of *M. aspera* are acknowledged on all hands to be large and purple. The East Indian *Melastoma* have not yet been carefully studied on the spot, by any accurate botanist, and the synonyms of this in particular have been much confused.—See *M. cyanoides*, hereafter described, a species to be introduced between Willdenow's n. 56 and 57.

12. *M. strigosa*. Linn. Suppl. 236; excluding the synonym.—Leaves ovate, three-ribbed, very bristly, entire. Flowers terminal, solitary. Calyx very bristly; its segments broad and triangular.—Sent by Mutis from New Grenada. This is a much-branched *shrub*, whose numerous leaves are ovate, stalked, about three-fourths of an inch long; paler, with three ribs very prominent, beneath. Every part is clothed with depressed yellow bristles. *Flowers* large, terminal, solitary, purple, their petals fringed with bristles; and the *calyx* is peculiarly hispid, with broad, short, triangular segments. It is a very handsome and remarkable species.

14. *M. velutina*. Willd. (*M. holosericea*; Herd. Linn Swartz. Obs. 176.)—Leaves three-ribbed, ovate, acute, entire, sessile, clothed on both sides with silky bristles. Cluster terminal, four-ranked; its branches cloven. Stem acutely quadrangular.—Native of Brasil, where it was gathered by father Panegai, and sent by Arduino to Linnæus; as well as by sir G. Staunton and sir J. Banks. We know no authority for its being found in Jamaica.—The leaves are from one to two inches long, sessile, remarkable for their dense silky bristly clothing. They have three principal ribs, with occasionally two slighter ones near the margin, towards the base. *Flowers* large and handsome, purple, with a very silky calyx, and ten long stamens.—This species is totally distinct from the original Linnæan *holosericea*, of which we shall speak hereafter. See n. 53.

14—15. *M. cuprea*.—Leaves three-ribbed, elliptic-ovate, pointed, entire, on short stalks; nearly smooth above; clothed with dense starry down beneath. Panicle terminal, thrice compound, with radiating branches.—Gathered in the Caraccas, by J. Mærtner, M. D. The branches, stalks, germen, and back of the leaves, are all densely clothed with fine starry hairs, which, in a dried state at least, are of a rich copper-coloured brown. A portion of the same is seen on the upper surface of each leaf, especially on the ribs. The segments of the calyx are smooth. *Flowers* very small and numerous, clustered, and composing a spreading, very compound panicle, whose branches spread in a radiating manner, many from one point, the lower ones at each ramification being the shortest. *Petals* not expanded in our specimen.—This should be placed between the 14th and 15th species of Willdenow. We can refer it to none that he enumerates.

14—15. *M. squamulosa*.—Leaves three-ribbed, elliptical,

obtuse, entire; smooth above; hoary beneath. Panicles terminal, compact. Calyx angular, minutely scaly.—Sent from New Grenada by Mutis to Linnæus. The stem is woody. *Leaves* on short thick stalks, rigid, elliptical, scarcely two inches long, obtuse, entire, with three distinct ribs, and numerous fine transverse veins. The upper side is green, quite smooth and rather shining; the under hoary, with very close, somewhat scaly, pubescence. *Panicles* terminal, compound, compact, about three inches long, many-flowered. *Calyx* turbinate, with ten ribs, and five broad short teeth, covered all over with close-pressed scurfy scales. *Petals* five, small, round, apparently yellow. *Berry* small, furrowed, hoary. Sometimes the flowers appear to be six-cleft.—This may stand next to our *cuprea*, though it has no particular likeness or affinity to that, or any other of this second section, being most allied to *ligustrina*, another new species hereafter described, from the same country.

20. *M. trinervia*. Swartz. Ind. Occ. 774.—Leaves three-ribbed, smoothish, elliptical, acute at both ends; the lateral ribs near the margin. Spikes long, axillary, in pairs. Flowers opposite or whorled.—Native of mountains in Jamaica. Introduced in 1793 into the stoves at Kew, where it blooms in July. The leaves are a span long, stalked, thin and pliant, of a broad, elliptical form, pointed at each end, pale beneath, with slightly downy veins. These leaves are peculiar for having the side ribs almost marginal, and very remote from the midrib, with which however they are connected by numerous transverse ribs, and reticulated veins. The inflorescence is so incorrectly described, that had we not authentic specimens, we could not have been certain of our plant. The flowers are small, numerous, in long downy spikes, two of which stand together in the forks of the branches, and are perhaps originally terminal, as Dr. Swartz describes, but the branch is soon extended on each side beyond them; neither are they racemi, for the flowers are perfectly sessile, in distant pairs, or sometimes whorls.

21. *M. repens*. Willd. n. 21. Lamarck Illustr. t. 361. f. 2.—“Leaves obovate, smooth, three-ribbed, nearly entire. Flowers solitary, terminal. Stem creeping.”—This, which is said to come from China, does not appear to us different from the *oñandra* of Linnæus, which varies in the number of parts in the flower, and will be hereafter described. We are at least certain that the synonyms of Osbeck and Retzius, cited here by Willdenow, belong to the real *oñandra*.

Section 3. *Stamens ten; leaves with three ribs combined at the base.*

23. *M. parviflora*. Aubl. Guian. 433. t. 171.—Leaves ovato-lanceolate, acute at each end, obscurely toothed, triple-ribbed, smooth. Panicle terminal, repeatedly three-forked.—Found by Aublet growing in moist situations in Cayenne and Guiana, where the inhabitants call it *tineta*, after the Portuguese, and use it in decoction to dye black. The stems are upright, shrubby, seven or eight feet high. Leaves a span long, pliant and quite smooth, green on both sides, but paler beneath, on smooth footstalks, scarcely an inch in length. They have three principal ribs, which in Aublet's specimen unite into one a little above the base, at not more than half the distance expressed in his plate. There are besides, as usual, a pair of much slighter marginal ribs, distinct to the bottom of the leaf. A large, very compound, three-forked panicle, of small white flowers, terminates each branch; but it sometimes becomes lateral by the elongation of the branch beyond. The berries are smooth, scarcely so big as a peppercorn, and of a blueish colour. The plant bears flowers and fruit in April.

25. *M. arborescens*. Aubl. Guian. 420. t. 163.—Leaves roundish-

roundish-ovate, acute, entire, triple-ribbed, smooth. Corymbs lateral. Petals divided at the base.—Native of woods in Guiana. A tree 60 feet high, with very broad ovate smooth entire leaves, rather opaque and paler beneath, four or five inches long. Their three central ribs are united for half an inch above the base; two lateral ones spring from the bottom; and there is also a pair of very slight marginal ones, not expressed in the plate. The flowers are white, produced in lateral bracted corymbs, from the sides of the branches, much below the foliage. The petals are described by Aublet with divided or double claws. Berry as big as a small medlar, yellow, sweetish, and eatable, known by the name of *mêlé* among the colonists. It ripens in November.—Willdenow justly points out the near resemblance of this plant to the Linnæan *M. grossularioides*, a species we have not seen, any more than himself, but its leaves are said to be toothed and pointed.

27—28. *M. ligustrina*. Leaves triple-ribbed, ovate, obtuse, entire, quite smooth. Panicles terminal, compact. Calyx hemispherical, furrowed, smooth.—Sent from New Granada, by Mutis to Linnæus. The stem and branches are woody, and, like the whole plant, perfectly smooth. Leaves stalked, an inch long, broadish-ovate, obtuse, entire, with three strong ribs united for a short distance from the base; the transverse veins are very slender, and the marginal ribs scarcely discernible. The upper surface is dark green, and polished; under paler and opaque, with a yellowish tinge. Flowers in compound clusters or panicles like those of Privet. Calyx short and hemispherical, most deeply furrowed in the upper part, quite smooth, with short, broad, blunt teeth. Petals small, roundish, white or purplish. Stamens short, with broad blunt anthers. Style obtuse. Stigma concave. Berry small, yellowish. All the flowers seem five-cleft. This is most akin to our *M. squamulosa*, described in the second section, though abundantly distinct, Linnæus had determined the genus of both, but left them undescribed.

Section 4. *Stamens ten; leaves with five combined ribs.*

28. *M. agrestis*. Aubl. Guian. 425. t. 166.—Very hairy. Leaves ovate, long-pointed, crenate, fringed, quintuple-ribbed. Corymbs axillary and terminal, spreading.—Native of banks of rivers, and about old walls, in Cayenne. Aublet. The specific name therefore must allude to its roughness of habit, not to its place of growth. The dense rusty-red spreading hairs, which clothe the branches, flower-stalks, footstalks, ribs and margins of the leaves, give the plant a tawny hispid aspect. The leaves are truly ovate, pointed, very neatly and closely crenate, about three inches long; their ribs disposed exactly as in the *arborescens* last described, so that both species ought to stand in the same section, whichever that may be. Aublet's figure is by no means correct in this point, according to his own specimen, and has misled Willdenow.

29. *M. scandens*. Aubl. t. 172. is more correctly quintuple-ribbed, as that figure expresses; but yet not in so striking a manner as some following species.

30: *M. alata*. Aubl. Guian. 410. t. 158.—Leaves elliptic-oblong, acute at each end, entire, quintuple-ribbed; rough above; downy beneath. Stem winged.—Native of uncultivated ground in Guiana and Cayenne, flowering in September, and fruiting a month or two afterward. The stems are six or seven feet high, remarkable for their four membranous wings. Leaves sessile, seven or eight inches long and about half as wide, much elongated at each end; rough above; paler and clothed with soft tufted down beneath. They have two pair of ribs, branching at wide intervals from the central one, besides a slight, nearly marginal, nerve. Panicle terminal, large, with square, partly winged,

stalks. Flowers in dense heads, small, whitish. Berry red, the size of a gooseberry, not very succulent. A decoction of the leaves is used to wash foul ulcers.

30—31. *M. nervosa*.—Leaves elliptic-oblong, acute at each end, slightly crenate, quintuple-ribbed; rather hairy on both sides. Spikes hairy, whorled.—Native of Jamaica. A specimen with the above name was given to the younger Linnæus from the Banksian herbarium. It was gathered by a man who deceived his employers, by pretending to have collected many of his plants at the isthmus of Darien; whereas it afterwards appeared he went no further than the West India islands. Hence some of his discoveries, being marked with a wrong place of growth, were not admitted by Dr. Swartz, (unless he had found them himself,) into his West Indian Flora. Such appears to be the case with the present *Melastoma*, which we cannot refer to any that is described. Its leaves agree much in size, form and ribs, with the *alata* last described; but they are crenate, and clothed with simple and longer hairs, especially the ribs. The stem is round, bristly, not winged. Flowers in sessile remote whorls, composing a long, terminal, hairy spike.

Section 5. *Stamens ten; leaves with at least five separate ribs.*

32. *M. hirta*. Linn. Sp. Pl. 559, excluding the synonyms of Plumier and Sloane. Swartz. Obf. 175. (M. n. 4; Browne Jam. 219. *Arbuscula Jamaicensis quinquenervis minutissimè dentatis foliis et caule pubescentibus, sifcusulis ex sinu foliorum gemellis; Pluk. Almagest. 40. t. 264 f. 1.*)—Leaves ovate, pointed, crenate, five-ribbed, hairy. Flowers axillary, somewhat corymbose, bristly as well as the branches.—Native of Brasil, as also of Jamaica. We have a specimen from Browne, nor can we account for the omission of this species in Swartz's Flora, as that author likewise mentions in his *Observationes* its growing on the woody hills of Jamaica, flowering in autumn and spring. The stem is shrubby, six feet high, the younger branches very hispid, as are the footstalks, flower-stalks, calyx, and both sides of the leaves, especially the under. All the pubescence is of a rusty hue. The leaves are broadly ovate, not at all lanceolate, with five distinct ribs, besides a pair scarcely discernible near the margin, towards the base. The flowers are white, few together, axillary and corymbose; sometimes said to be six-cleft.

34. *M. Acinodendron*. Linn. Sp. Pl. 558. Swartz. Obf. 174. (*Chrittophoriana americana, malabathri foliis acuminatis, nervosis, dentatis; Pluk. Phyt. t. 159. f. 1.*)—Leaves ovate, pointed, five-ribbed, finely toothed, slightly hairy. Panicle terminal, compound, three-forked, roughish. Flowers somewhat capitate.—Native of Surinam. Baker. *Herb. Banks*. Dr. Swartz remarks that this is an obscure species, the synonyms of which are much confounded. The Linnæan herbarium throws no light upon it, but we have received from sir J. Banks, under the name of *M. aurea*, which is very well suited to the colour of the dried leaves, a Surinam specimen, that indubitably accords with Plukenet's figure, which Linnæus commends; and as our specimen will not agree with any other described *Melastoma*, we refer it to the present, omitting all the synonyms as doubtful, except the above. The branches are smooth, slightly quadrangular upwards. Leaves about three inches long, on rather short hairy stalks, (the only character not expressed by Plukenet,) ovate, neatly toothed, with a short taper point, and five ribs connected by numerous transverse parallel veins. There is a very slight marginal rib near the base. A few golden hairs are sprinkled over the upper surface, and on the ribs of the lower. Panicle large and spreading, repeatedly three-forked, roughish with scattered stellated down. Flowers usually

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usually two or three together, sessile, with a pair of *bractes*, at the end of each stalk of the panicle. *Calyx* smooth, turbinate. *Petals* five, apparently white or yellowish, obovate.

35. *M. cymosa*. Schrad. Sert. Hannov. 18. t. 8. Vent. Malmaif. t. 14. (*M. corymbosa*; Ait. Hort. Kew. ed. 2. v. 3. 46?)—Leaves ovate, somewhat heart-shaped, pointed, seven-ribbed, somewhat hairy, with minute bristly serratures. Cyme terminal. Segments of the calyx triangular.—Native of South America according to Schrader; and, if we are right in the citation of Hort. Kew., of Sierra Leone also. It is not probable that so fine a plant, for many years past frequently seen flowering in the English stoves, should not be included in that rich catalogue, and it answers most precisely to the character there given under the name of *corymbosa*, except that the flowers are really cymose. We received a specimen in 1803, from the botanic garden at Liverpool, with the appellation of *M. purpurea*, under which it stands in the catalogue of that garden, p. 250. The *stems* are erect, about two feet high, succulent, herbaceous, scarcely shrubby. *Leaves* two or three inches long, on longish stalks, tender, of a broad, ovate, pointed figure, very slightly cordate at the base, fringed with minute bristly teeth directed forwards. The ribs are seven, besides a minute marginal pair at the base. Both sides are roughish with minute hairs; the under one palest, and most polished. *Flowers* several, rose-coloured, in a terminal, rather drooping, slightly downy cyme. There are five yellow abortive anthers; the five perfect ones are purplish.

37. *M. elegans*, beautiful as it appears in Aublet's t. 167, is in every respect so like *hirta*, see n. 32, except the deeper and double crenatures of the *leaves*, that we are persuaded it is but a variety of that species. There is no difference in the *inflorescence* or *flowers*.

40. *M. Maieta*. Lamarck Dict. v. 4. 34. (*Maieta guianensis*; Aubl. Guian. 443. t. 176.)—Leaves elliptical, pointed, five-ribbed, minutely crenate, hairy, inflated at the base. Flowers axillary, solitary, sessile.—Found by Aublet in Guiana, on the banks of a rivulet fifty miles from the sea-coast, flowering and fruiting in November. It is a *shrub* two or three feet high, the branches and foliage rough with bristly, prominent, rusty hairs. *Leaves* opposite, but very unequal in size, elliptical with a taper point and five ribs, without any at the margin besides. The larger *leaf* of each pair is from three to five inches long, and distinguished by a bladder-like swelling, of two cells, at the base, most prominent at the upper side; the smaller *leaf* is from one and a half to two inches long, and is usually destitute of any such bladder. The *flowers* are white, axillary, and solitary, bracteated at their base. It is difficult to imagine what led Aublet to distinguish this, as a genus, from *Melastoma*, to which it has not the slightest pretensions. The germen in the flower is indeed apparently superior, and distinct from the body of the calyx; but such is the case in many *Melastoma*, though those parts unite into a pulpy mass as the fruit ripens.

41. *M. heterophylla*. Lamarck Dict. v. 4. 34; and

42. *M. physiphora*. (Tococa guianensis; Aubl. 438. t. 174.) agree with the last in having a bladderly appendage to the base of the larger *leaves*, or, in the latter instance, to their *footstalks*.

49. *M. grossa*. Linn. Suppl. 236.—Leaves somewhat heart-shaped, five-ribbed, entire, very rough. Flowers terminal, corymbose. *Petals* bristly at the back.—Sent by Mutis from New Granada. This very magnificent species is distinguished by its coriaceous and bristly appearance. The *leaves* are scarcely two inches long, about one broad,

with five strong ribs, and numerous close transverse veins, clothed very densely on both sides, with innumerable, minute, rigid, curved bristles; paler beneath. The *branches* and *stalks* are all equally hispid, and of a rusty hue. *Flowers* very large, purple, about five or six in a terminal corymbose head. Segments of the *calyx* long and lanceolate. *Petals* obovate, above an inch long, clothed at the back, like the *calyx*, with rigid upright bristles.

50. *M. malabathrica*. Linn. Sp. Pl. 559. Curt. Mag. t. 529?) *M. foliis lanceolato-ovatis scabris quinquenerviis*; Linn. Zeyl. 76. n. 171. *M. quinquenervia hirta major, capitulis fericeis villosis*; Burm. Zeyl. 155. t. 73. Kadali; Rheede Malab. v. 4. 87. t. 42. *Fragarius niger*; Rumph. Amb. v. 4. 137. t. 72.)—Leaves elliptic-lanceolate, five-ribbed, entire, rough with depressed bristles. Flowers terminal, corymbose. *Calyx* clothed with fringed imbricated scales.—Native of the East Indies. It is said to have been given to Kew garden by Sir G. Staunton in 1795. We quote the Botanical Magazine with doubt, because the figure is unfortunately so contrived as not to shew the *calyx*, a most important part in this case; neither does the form of the *leaves*, or the situation of their lateral ribs, precisely agree with our wild specimens. Of the other synonyms we have no doubt. Burmann, whose remarks on this plant are very good, observes that the calyx is drawn smooth in Rheede's figure, though described rough. Rumphius most happily compares it to the calyx of *Centaurea Cyanus*. It is in fact clothed with fine sharp-pointed fringed scales, such as we have remarked in no other species. The *petals* are large and purple, smooth on both sides, but fringed with bristles. The young *branches*, *stalks*, and ribs of the *leaves*, are scaly in a degree like the *calyx*. Sometimes the lateral ribs are so small and slender as to be scarcely discernible. A specimen so circumstanced is in the Linnæan herbarium marked *aspera*; see n. 10.

50—51. *M. granulosa*. Lamarck Dict. v. 4. 44.—Leaves ovate-lanceolate, five-ribbed, entire; rough above with close-pressed bristles; downy beneath. Cluster with corymbose branches. *Calyx* silky. Stem winged.—Gathered by Commerçon in Brazil, and given by Thouin to the younger Linnæus. A magnificent species, with *leaves* five or six inches long, whose outermost ribs are united at the base to the next. Their upper surface is so granulated, as it were, with close-pressed bristles, as to look like the surface of a strawberry. The *stem* is bristly, nearly in like manner, and has four membranous wings. *Flowers* purple, large, and handsome, in a compound forked cluster. *Calyx* densely covered with silky hairs. This *shrub* is about ten feet high.

53. *M. albicans*. Swartz. Ind. Occ. 786. (*M. holosericea*; Linn. Sp. Pl. 559. Willd. n. 13. *Arbor racemosa brasiliensis, foliis malabathri*; Breyn. Cent. 1. 3. t. 2. 4.)—Leaves ovate, acute, five-ribbed, entire; polished and naked above; rusty-white with cottony down beneath. Clusters terminal, cottony, with cymose branches. Flowers sessile.—Native of Brazil and of Jamaica. A *shrub* six or eight feet high, with hoary *branches*, which are slightly angular. *Leaves* on short, thick, hoary stalks, elliptic-ovate, acute, three or four inches long, very slightly heart-shaped at the base; perfectly smooth and highly polished above, so as to look, when dried, like black Spanish leather, as Breynius very happily remarks; on the under side they are entirely clothed with dense soft cottony down, white with a rusty tinge, and have five strong ribs, all united at a very small distance above the base. The *chylers* are composed of opposite forked or cymose branches. The *flowers* are sessile, small, with a cottony *calyx* and white *petals*.

About

MELASTOMA.

About this species there has been great confusion. It is unquestionably the original *holosericea* of Linnæus, (admirably described and figured by Bryonia,) but not that which he afterwards called so in his herbarium, and which Dr. Swartz described in his *Obs. Bot.*; see *volantia*, n. 14. The name however of *holosericea* is not so applicable to the plant before us, as that given by Swartz, by which it is most generally known, and which for that reason we have retained, as the best means of avoiding mistake.

56—57. *M. cyanides*. (Fragaria ruber; Rumph. Amb. v. 4. 135 t. 71. Katou-Kadali; Rhede Malab. v. 4. 91. t. 43.)—Leaves ovate, acute, five-ribbed, entire; roughish on both sides with close-pressed bristles. Clusters terminal, forked. Calyx clothed with clustered bristles. Bractæas ovate, fringed.—Sent from Amboyna by the late Mr. Christopher Smith. We can refer it to none in Willdenow or Lamarck, but we quote without hesitation the above synonyms, which have been, surely erroneously, referred to the true *M. aspera*; see n. 10. The present is rather a small and weak shrub, with slender, grey, slightly bristly branches. Leaves bright green on both sides, paler beneath, ovate, rather pointed, three inches long, and above one broad, with five distinct ribs, of which the lateral ones are nearly as considerable as the rest. The upper surface is besprinkled with yellow close-pressed bristles; the under is chiefly bristly at the ribs and veins. Footstalks bristly, purplish, half an inch long. Panicles terminal, forked or corymbose, a little bristly, with a pair of ovate, concave, smooth though fringed bractæas, at each division. Calyx densely covered with clustered, sometimes palmate, whitish bristles, which are, as far as we have seen, peculiar to this species, and give the part in question a great resemblance to *Centauria Cyanus*. The petals are said by Rumphius to be white; in the Hortus Malabaricus they seem implied to be purple. The fruit is compared by the former author to a strawberry, being redder on one side than the other. It is agreeably acid, with some astringency, and is given to children in Amboyna, to prevent what some learned corruptor of English may hereafter call lestimition.

Section 6. *Stamens eight; leaves with three separate ribs.*

59. *M. microphylla*. Swartz. Ind. Occ. 813; is erroneously placed here. It has ovate, obtuse, hairy leaves, about an inch long, most evidently triple-ribbed. The flowers are small, with a very hispid calyx, and stand in the forks of the branches, one usually nearly sessile, with two or three others on capillary, hairy, simple stalks. The fruit looks like that of a *Croton*, but has four furrows; nor are the leaves dissimilar to some of that genus, yet we cannot refer our plant to *M. crotonifolia*, n. 35. of Lamarck. The present species is but ill compared by Swartz to his *hirtula*, which we have from himself, and which is more related to *hirta*; see n. 32. It must always be remembered that these sections of the genus, which we have adopted from Willdenow, are entirely artificial, as well as somewhat inconstant.

61. *M. capillaris*. Swartz. Ind. Occ. 808.—Leaves lanceolate, pointed, three-ribbed, smooth, nearly entire. Stalks axillary, capillary, three-flowered. Native of hills in the south parts of Jamaica. A very fair example of this section. It is remarkable for its extremely minute, whitish, short-lived flowers, which stand, three together, on roughish, capillary, axillary stalks. The calyx has four minute upright teeth. The berry also is perhaps the smallest in the whole genus. The young leaves are somewhat downy beneath, but the full-grown ones are smooth, three inches long, narrow, taper-pointed, pale at the back, with three

ribs, and strong, simple, transverse veins. We have a specimen from its discoverer.

64. *M. glandulosa*. Swartz. Ind. Occ. 799.—Leaves ovate, entire, with three ribs besides the marginal ones, hispid on both sides, with axillary tufts of bristles at the veins beneath. Panicles terminal, three-forked, very rough. Gathered by Masson and Swartz on the loftiest hills of Jamaica. This is akin to some of the roughest leaved species before described, but distinguished by pale tufts of bristles at the separation of each vein from the midrib beneath. The leaves are about three inches long, and more than one broad; the bristles of their upper side most rigid, yellow and hooked. Panicle spreading, many-flowered, excessively hispid. Petals four, with longish claws. Stamens eight. Anthers bordered at each side with a yellow membrane. Style long and prominent. We cannot but remark that this is properly a five-ribbed species, and ought to stand in a section hereafter mentioned.

67. *M. octandra*. Linn. Sp. Pl. 560. (*M. foliis lanceolatis trinerviis glabris, margine hispidis*; Linn. Zeyl. 76. n. 173, excluding the synonyms. *M. repens*; see n. 21.)—Leaves ovate, entire, three-ribbed, smooth, with a simple marginal row of close-pressed bristles. Flowers terminal, mostly solitary. Calyx bristly.—Native of Ceylon and China. The stem is rather woody, but prostrate, branched and creeping. Leaves about an inch long, of a broad ovate obtuse figure, three-ribbed, besides an occasional pair of obsolete marginal ribs; dark green above; very pale and yellowish beneath; smooth and naked on both sides, except a few hairs on the ribs beneath, and a very remarkable row of marginal close-pressed oblique bristles, on the upper side, resembling litches of thread; these are sometimes partially wanting. Flowers terminal, mostly solitary, large, purple, very handsome. Calyx clothed with simple incurved bristles. Petals fringed, barbed at the summit with a bristly tuft.

Lamarck was led by the synonym of Burmann, erroneously quoted by Linnæus, to describe and figure this real *M. octandra* of the latter as a new species, by the name of *repens*. This name however we should wish to retain, as the flowers in our specimens are most frequently five-cleft and decandrous. We know not why the leaves have ever been described as in any degree lanceolate, they being truly ovate. Half the stamens appear to be always abortive.

69. *M. tetrandra*. Swartz. Ind. Occ. 795.—Leaves three-ribbed, oblong, pointed, entire, smooth, with a notch at the base. Cluster erect, terminal. Stamens four.—Native of the Blue mountains in the south of Jamaica, but very rare. Flowering in May. This is a middling-sized tree, whose young branches are square, and nearly smooth. Leaves three or four inches in length, and one in breadth, on long stalks, smooth, entire, pointed, rounded at the base, with a notch at the footstalk. They have one strong central rib, with a slight marginal pair only. The flowers we have not seen. Dr. Swartz describes them as small and white, in a terminal compound cluster, which is rough with rusty mealiness. They are four-cleft, with but four stamens. Berry minute, roundish.

71. *M. angustifolia*. Swartz. Ind. Occ. 796.—Leaves three-ribbed, linear-lanceolate, entire; hoary beneath. Branches wand-like. Clusters terminal, repeatedly three-forked, mealy and rusty.—Native of Jamaica and other West Indian islands. A slender shrub, distinguished by its elegant narrow leaves; of a bright yellowish-green, and smooth, above; hoary and slightly rusty, with beautifully regular transverse veins beneath. Clusters terminal, stalked,
with

with many forked, spreading, cymose branches. *Calyx* mealy. *Petals* four, pale yellow. *Stamens* eight.

Section 7. *Stamens* eight; *leaves* with three combined ribs.

78. *M. Jabrofa*. Linn. Sp. Pl. 558. Swartz. Obf. 174. (M. n. 5; Browne Jam. 219. t. 24. f. 3.)—Leaves ovate, crenate, triple-ribbed, rough and hairy. Branches densely shaggy. Flowers axillary, aggregate, octandrous.—Native of the cooler mountains of Jamaica. A *shrub* about a man's height, whose branches are densely covered with short shaggy hairs, like the stalks and ribs of the *leaves*, which last are broad-ovate, three inches long, very harsh and hispid on both sides, furnished with three ribs combined at their base, and two distinct ones nearer the margin, which is irregularly crenate. Swartz describes the *flowers* as very minute, pale red, sessile and axillary. Of these Browne's specimen in the Linnæan herbarium retains two or three, which however stand on stalks, about as long as the *calyx*. The segments of the latter are awl-shaped.

Section 8. *Stamens* eight; *leaves* with five ribs.

80. *M. umbrosa*. Swartz: Ind. Occ. 817.—Leaves roundish-ovate, pointed, finely toothed, hairy on both sides. Clusters axillary, compound, bristly, spreading.—Found in several of the West Indian islands. This species has very hispid *branches* and *stalks*, and is remarkable for its large, almost round, taper-pointed *leaves*, broader than the hand, which have five ribs, besides the marginal ones, all running from the base to the extremity. The *clusters* are axillary, and in pairs, scarcely longer than the footstalks, twice compound, spreading widely. *Braçtas* spatulate, recurved, bristly. *Flowers* white, very small.

85. *M. coccinea*. Vahl. Eclog. v. 1. 48.—Leaves elliptic-ovate, pointed, five-ribbed, entire, smooth. Branches hispid at intervals.—Native of the island of Montserrat. *Stem* arboreous. *Branches* bluntly quadrangular, hollow, knotty, clothed here and there with irregular interrupted tufts of horizontal pale hairs, like radicles. *Leaves* several inches in length and breadth, smooth, entire, with five ribs besides the two marginal ones, the three in the centre slightly combined at their base. The *flowers* are said to be scarlet, or occasionally white, forming a terminal *thyrsus*, which we have seen but in an imperfect condition. S.

MELASTOMA, in *Gardening*, contains plants of the evergreen tree and shrubby exotic kinds, of which the species cultivated are, the American gooseberry of Surinam (*M. grossularioides*); and the fattiny-leaved melastoma (*M. hololicea*).

But there are other species which may be cultivated.

Method of Culture.—These tender plants are best obtained by having the entire fruits put up in their native places in dry sand as soon as ripened, and immediately forwarded, which as soon as they arrive should be taken out, and the seeds sown in pots of light earth, plunging them in a moderate hot-bed of tanners' bark: when the plants are up, and fit to remove, they should be planted each in a small pot of light earth, replunging them in the tan-bed of the stove.

Afterwards they require the management of other woody stove-plants.

And they may also be increased by laying the young branches in the spring, or by planting cuttings of the young shoots in the summer season in pots, and plunging them in a hot-bed. They should afterwards have the same culture as the other kinds.

MELASTOMÆ, in *Botany*, a very beautiful but not extensive natural order in Jussieu's system, of which the genus from whence the name is derived makes the principal part. (See MELASTOMA.) This order is the 90th of Jussieu, the

eighth of his 14th class. The characters of that class are given under the article FICOIDÆÆ. It has two cotyledons, many petals, and stamens inserted into some part of the calyx.

The *Melastomæ* are thus distinguished.

Calyx of one leaf, tubular, either superior or inferior, simple or surrounded with scales. *Petals* several, of a definite number, inserted into the top of the calyx, equal in number to its segments and alternate with them. *Stamens* inserted into the same place, of a definite number, which is double that of the petals; the top of the filaments, beneath the anthers, mostly furnished with two bristles, or two auricles; anthers long, beaked at the summit, attached by their base to the top of the filaments, and, at first, drooping, in consequence of the filaments being bent inwards; but as the latter afterwards become straight, the anthers rise upwards. *Germen* sometimes superior, enclosed by the calyx, sometimes inferior; style solitary; stigma simple. *Fruit* either pulpy or capsular, invested, when superior, with the calyx, which is contracted above; when inferior, attached to the same part, and swelling beneath it, of many cells, with numerous seeds in each cell. *Corculum* suspected by Jussieu to be unaccompanied with albumen. *Stem* rather arboreous, or shrubby, or rarely herbaceous. *Leaves* opposite, simple, with three or more longitudinal ribs. *Flowers* opposite, either axillary or terminal, their stalks either single or many-flowered.

The first section is said to have an inferior germen, and consists of *Blakea* of Browne and Linnæus, to which it is doubtful whether the *Blakea* of Aublet be properly united as one genus; *Melastoma*, see that article; and *Tristemma*, a genus of Jussieu's, brought by Commerçon from the Mauritius.

Section the second is characterized by a superior germen, and consists of *Topobea* of Aublet, with *Tibouchina*, *Mayeta* or *Maieta*, and *Tococa* of the same author, which two last are now referred to *Melastoma*, there being really no generic distinction. To these are added *Osbeckia* and *Rhexia* of Linnæus, whose fruits are capsular.

The plants of this order are, on the one hand, akin to the *Myrti*, and on the other to the *Salicariæ*, but distinguished from both by their very conspicuous large and long-beaked anthers, with appendages at their base. By the definite number of their stamens they are moreover distinguished from the *Myrti*, to which we may add the peculiarly ribbed leaves, and rigid depressed pubescence, of many species, and the want of an aromatic quality. To the *Salicariæ* they are more similar in habit.

Number of parts is one of the most variable circumstances belonging to this order, the stamens differing in different species, and even varying sometimes in the same, from eight to ten, or from ten to twelve; and consequently the petals and calyx-teeth from four to five or six; of which the genus *Melastoma* affords instances.

MELAVÉRD, in *Geography*, a town of Persia, in the province of Irak; 45 miles N.E. of Ispahan.

MELAUÏ, or MELLAVOÛÉ, a small and tolerably handsome town of Egypt, situated half a league from the W. bank of the Nile, and the residence of a "kiaschef." The plain surrounding it is very fertile, particularly in corn, a great quantity of which is exported by way of Cairo, Suez, and the Red sea to Mecca, and other parts of Arabia. The Christians have no church, but repair to the convent on the other side; 120 miles S. of Cairo. N. lat. 28° 2'.

MELAZZO, or MILAZZO, anciently *Myle*, a sea-port town of Sicily, in the valley of Demona, situated in a bay on the N. coast of the island. It consists of two parts, one of which stands on a promontory of the same name,

and

and is fortified: the other, on a bay, with a good harbour, the entrance of which is defended by a castle, 18 miles W. of Messina. N. lat. 38° 16'. E. long. 15° 23'.

MELBON, one of the cluster of the "Seven Islands," in the English channel, near the coast of France. N. lat. 48° 54'. W. long. 3° 22'.

MELBY, a town of Norway, in the province of Aggerhus, on the Glomme; 55 miles N.E. of Christiania.

MELCAPOUR, a town of Hindoostan, in the Candish; 20 miles S. of Burhampour.

MELCHITES, or MELCHITES, in *Ecclesiastical History*, were those Christians in Syria, Egypt, and the Levant, who in the seventh century, though not Greeks, followed the doctrines and ceremonies of the Greek church. They were called *melechites*, i. e. *royalists*, from the Hebrew *melech*, king, by their adversaries, by way of reproach, on account of their implicit submission to the edict of the emperor Marcian, in favour of the council of Chalcedon. For the same reason the emperor Justinian had the epithet Chalcedonensis given him.

MELCHIZEDECH, in *Biography*, king of Salem, and priest of the most high God, is mentioned in the scriptures, but without any reference to his genealogy, or to his birth or death: and in this sense, it has been asserted, he was a figure of Jesus Christ, as is affirmed in the epistle to the Hebrews, "Who is a priest for ever, according to the order of Melchizedech," and not according to the order of Aaron, whose origin, life, and death are known. When Abraham returned from pursuing the confederate kings, who had defeated the kings of Sodom and Gomorrah, and had taken away Lot with them, Melchizedech came to meet Abraham, and presented to him bread and wine with his benediction. (Gen. xiv. 17, &c.) Abraham, being desirous to acknowledge in him the quality of priest of the Lord, offered him the tythes of all that he had taken from the enemy. After this time there is no mention made of Melchizedech, till the 110th psalm, where, in allusion to the Messiah, it is said, "Thou art a priest for ever after the order of Melchizedech." It having been asserted, that he was without father or mother, some of the early Christians assumed that he was a celestial being, superior to angels. These obtained the name of *Melchizedechians*; which see.

MELCHIZEDECHIANS, or MELCHISEDEKIANS, ancient sectaries, so called, because they raised Melchizedech above all creatures, and even above Jesus Christ.

The author of this sect was one Theodotus; whence the Melchizedechians become more commonly known by the name of Theodotians; all the difference between those and the strict Theodotians consisting in that particular article relating to Melchizedech; who, according to them, was the great and supreme virtue.

This sect was revived in Egypt towards the close of the third century by Hierax. (See *HIERACITES*.) Those also in later times, who have maintained that Melchizedech was the son of God in a human form, may be distinguished by this appellation. See *Cunæus de Rep. Hæbræorum*.

MELCK, or MÖLK, in *Geography*, a town of Austria, near the Danube. In its vicinity is a famous cloister of Benedictines, seated on a rock; its library is said to consist of some curious and valuable MSS.; 11 miles W. of St. Polten.

MELCOMBE-REGIS, a borough and market-town in the hundred of Uggescombe, Dorchester division of the county of Dorset, England, is situated eight miles from Dorchester, 127 miles from London, at the mouth of the river Wey, which separates it from Weymouth. The

population of Melcombe in the year 1801, according to the return made to parliament, was 2350, occupying 471 houses. This borough has sent two representatives to parliament ever since the reign of Edward II. Melcombe and Weymouth are so frequently joined in ancient grants, that there is some difficulty in separating them; though each had distinct privileges; of which Melcombe, being the favoured borough, and part of the demesne of the crown a considerable time before Weymouth, had the greater share, and is principally noticed in succeeding charters to the exclusion of its neighbour. Hence arose disputes between the rival boroughs respecting their privileges; and the contention had arrived to so great a height in the reign of Elizabeth, that the expediency of a union became apparent; and they were accordingly incorporated by an act passed in the 13th year of that queen (afterwards confirmed by James I.) and directed to be called "The united town and borough of Weymouth and Melcombe-Regis." The civil government, with other local circumstances relative to Melcombe, will be found under WEYMOUTH. Sir James Thornhill, the celebrated painter of the cupola of St. Paul's cathedral and the halls of Greenwich hospital and Blenheim, was born at Melcombe in the year 1675, and died at his seat at Thornhill, near this town in 1734. (See *THORNHILL*.) Beauties of England and Wales, vol. iv. Hutchin's History of Dorchester, 2 vols. folio.

MELCONDA, a town of Hindoostan, in Dowlatabad; 23 miles W. of Beder.

MELDAL, a town of Norway, in the province of Drontheim; 30 miles S.S.W. of Dronheim.

MELDFÉE, in our *Old Writers*, a recompence due and given to him that made the discovery of any breach of penal laws, committed by another person, called the promoter's or informer's fee.

The word is Saxon, from *meldfeob*.

MELDOLA, in *Geography*, a town of Italy, in the department of the Rubicon; seven miles S. of Forli.

MELDORP, a sea-port of Holstein, at the mouth of the river Myle; 50 miles N.W. of Hamburg. N. lat. 54° 10'. E. long. 9° 4'.

MELDRUM, a town of Scotland, in the county of Aberdeen, being a burgh of barony, and holding a weekly market; 16 miles N.N.W. of Aberdeen.

MELEAGER, in *Biography*, a Greek poet, son of Eurates, was a native of Gadara, in Syria, or of Atthis, a village in its territory, and is supposed to have flourished about a century before the Christian era. He spent his youth chiefly at Gadara, where he formed himself upon the style and manner of Menippus, an elder poet of that place. He afterwards resided at Tyre, and finally passed over to Cos by way of refuge from the wars which ravaged Syria, and died there at an advanced age. He was the first who made a collection of the short poems called by the Greeks epigrams. Of these he formed two sets, under the title of "Anthologia," the *first* of which was a lamentable proof of the licentiousness of the age and country; the *second*, consisting of miscellaneous pieces, has formed the basis of the later anthologies of Agathias and Planudes. Many of the poems are the work of Meleager, and possess much elegance: an edition of the poems was given by Brunck in 1709. Gen. Biog.

MELEAGRIS, in *Natural History*, a genus of birds of the order Gallinæ. Bill conic, incurvate; head covered with spongy caruncles; chin with a longitudinal membranaceous caruncle; tail broad, expansile; legs spurred. According to Buffon, there is but one known species, which he says is a large unwieldy bird, the anterior part of the

head

head is strangely covered and ornamented with a pendulous, soft, and fleshy substance, as also are the sides of the head and throat; the eyes are small, but bright and piercing; the bill convex, short and strong; a long tuft of coarse black hairs on the breast, the wings moderately long, but not at all formed for supporting so large a bulk in long flights; the legs moderately long, and very robust. In Gmelin's edition of Linnæus, two species are mentioned, namely, the Gallipavo and Satyra, of which the following are the characteristics.

Species.

GALLIPAVO. Front and chin carunculate; breast of the male tufted. It inhabits America; is above three and a half feet long, is domesticated every where, and varies much in its colours; in a wild state, it lives in woods and feeds on nuts, acorns, and insects; roosts on the highest trees, is very irascible and impatient of any thing red; the cock struts with an inflated breast, expanded tail, red face and relaxed frontal caruncle, and makes a singular inward noise, which, when it is uttered, shakes the whole body; eggs numerous, white, with reddish or yellow spots; it has eighteen tail-feathers. The female has no spur.

SATYRA. Head with two horns; body red with eye-like spots. This is called the horned turkey. It inhabits India, and is less than the last species. The bill brown; nostrils, front, and area of the eyes covered with black hair-like feathers; crown red; horn callous, blue, bent back; caruncle of the chin dilatible, blue, varied with rufous; legs whitish, spurred; it has 20 tail-feathers. The female has its head covered with feathers, without horns or gular caruncle; feathers of the head and upper part of the neck black-blue, long, decumbent; rest of the body as in the male, red, with eye-like spots; spurs more obtuse.

MELEAGRIS, the Guinea-hen or Pintado, a species of *Numida*; which see.

MELEAGRIS, in *Zoology*, a species of *Anguis*.

MELEDA, in *Geography*, an island in the Adriatic, separated from the peninsula of Sabioncello by a narrow channel, belonging to the republic of Ragusa. It is about 30 miles long, and of an unequal breadth, and is intersected by many bays and inlets, which afford good harbours for fishermen. It produces vines, orange and lemon trees, but not sufficient corn for the inhabitants, who amount to about 2000, occupying six or seven villages. N. lat. $43^{\circ} 5'$. E. long. $17^{\circ} 44'$.

MELELA, a town of Africa, in Barca; 76 miles S.W. of Tolometa.

MELEMBBA, a town of Cacongo. S. lat. $5^{\circ} 30'$. E. long. $11^{\circ} 55'$.

MELENES, a small island in the English channel, near the coast of France. N. lat. $48^{\circ} 48'$. W. long. $3^{\circ} 31'$.

MELENKI, a town of Russia, in the government of Vladimir, on the Oka; 44 miles S.E. of Vladimir. N. lat. $60^{\circ} 24'$. E. long. $41^{\circ} 24'$.

MELES, BADGER, in *Zoology*, a species of *Ursus*; which see.

MELETIANUS, in *Ecclesiastical History*, the name of a considerable party, who adhered to the cause of Meletius, bishop of Lycopolis, in Upper Egypt, after he was deposed about the year 306, by Peter, bishop of Alexandria, under the charge of his having sacrificed to the gods, and having been guilty of other heinous crimes; though Epiphanius makes his only failing to have been an excessive severity against the lapsed. This dispute, which was at first a personal difference between Meletius and Peter, became a re-

ligious controversy; and the Meletian party subsisted in the fifth century; but was condemned by the first council of Nice.

MELETIN, in *Geography*, a river of European Turkey, which runs into the Pruth, 12 miles N. of Jassi, in the province of Moldavia.

MELETZKOL, a town of Russia, in the province of Tobolsk; 44 miles N. of Archinsk.

MELFI, a town of Naples, in Basilicata, the see of a bishop, containing seven churches and eight convents; five miles N.W. of Venosa. N. lat. $41^{\circ} 1'$. E. long. $15^{\circ} 39'$.

MELFORD, LONG, an extensive village, situated near the river Stour, in the hundred of Babergh, and county of Suffolk, England. It is about one mile in length, whence the characteristic appellation *long*, and contains, according to the parliamentary returns of 1801, 450 houses, and 2204 inhabitants, viz. 1034 males and 1173 females. Of these 1837 were returned as employed in different departments of trade. Few villages in England can boast of a more agreeable situation than this, the immediate vicinity being distinguished by much beautiful and picturesque scenery. The church, which stands on an elevated spot at the north end of the village, is a curious piece of architecture in the pointed style of the fifteenth century. Its length is 180 feet, exclusive of the school-house at the western extremity. The chancel, or east end, is distinguished for its masonry, consisting of flint work, and squared stones; and beneath the parapet is an inscription in old letters. In the north aisle is an altar tomb for William Clopton, esq., whose statue, in armour, rests on the top; he died in 1446. His son, John Clopton, who was sheriff of the counties of Norfolk and Suffolk in the time of Henry VI., was interred under an altar tomb in the chancel. Near the communion table is a large and stately marble monument to the memory of sir William Cordell, who was speaker of the house of commons in the reign of queen Mary. This gentleman founded an hospital here, which is still standing, almost close to the church. It is a respectable brick building, and is sufficiently endowed for the support of a warden, twelve poor men, and two women, who are required to be old and decayed housekeepers of Melford. Several Roman urns have been dug up in this parish within these few years. At a short distance east of the church is Melford Hall, the seat of sir H. Parker, bart. The house, a large brick building, appears to be of the age of queen Elizabeth. At the dissolution of religious houses, this estate was granted to sir William Cordell. About half a mile north of the church is Kentwell Hall, formerly the seat of the Cloptons, but now the seat of Richard Moore, esq. The house is large, and was formerly surrounded by a moat, three sides of which are still remaining; the fourth, or east side, has been filled up. Beauties of England and Wales, vol. xiv. by F. Shoberl. Kirby's Suffolk Traveller.

MELGAR, a town of Spain, in Old Castile; 23 miles W.N.W. of Burgos.

MELGASSO, a town of Portugal, in the province of Entre Duero e Minho, situated on the Minho, and defended by a castle; 30 miles N. of Braga. N. lat. $42^{\circ} 5'$. W. long. 8° .

MELHANIA, in *Botany*, Forsk. *Ægypt.-Arab.* 64. Juss. 277; a genus of Forskall's, named by him from Melhân the Arabic appellation of the hill upon which he gathered it, and which is rich in curious plants. He describes this as a branched spreading shrub, two cubits high, with soft, ovato-lanceolate, serrated leaves, and yellow, axillary, stalked flowers. The calyx is double; the outer of three, inner of five, leaves. Stamens five, inserted into a nectariferous

ferous crown, with five intermediate linear bodies, exceeding them in length. *Style* one, with five stigmas. *Capsule* globose, of five cells and five valves. *Seeds* four in each cell, angular, dotted.

The only species in *M. velutina*, described above. Jussieu suspects it to be of the same genus as *Dombeya* and *Affinia* of Cavanilles, both united under the latter name by Schreber. Our plant is *Dombeya velutina*, Willd. Sp. Pl. v. 3. 726. (*Pentapetes velutina*; Vahl. Symb. v. 1. 49.) We have already objected to this *Dombeya* in describing the true one. See *Dombeya*.

MELHUA, or MELLUAH, in *Geography*, a town of Syria, in the desert; 20 miles S.E. of Aleppo.

MELIA, in *Botany*, a name adopted by Linnæus for this tree, apparently because its leaves resemble those of the *Az*, which is doubtless the true *Melia* of the ancient Greeks. Linn. Gen. 211. Schreb. 286. Willd. Sp. Pl. v. 3. 558. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 39. Juss. 265. Lamarek Illustr. t. 352. Cavan. Diff. 363. (*Azedarach*; Tournef. t. 387.)—Class and order; *Decandria Monogynia*. Nat. Ord. *Tribilata*, Linn. *Meliz*, Juss.

Gen. Ch. *Cal.* Perianth of one leaf, very small, five-toothed, erect, obtuse. *Cor.* Petals five, linear-lanceolate, spreading, long. Nectary cylindrical, of one leaf, the length of the corolla, with a ten-toothed mouth. *Stam.* Filaments ten, very small, situated within the apex of the nectary; anthers oblong, not protruding beyond it. *Pist.* Germen conical; style cylindrical, the length of the nectary; stigma capitate, with five, conniving valves. *Peric.* Drupa globose, soft. *Seed* a roundish, five-furrowed, five-celled nut.

Ess. Ch. Calyx five-toothed. Petals five. Nectary cylindrical, toothed at its mouth, bearing the anthers. Drupa a nut of five cells.

1. *M. Azedarach*. Common Bead-tree, or Pride of China.—Linn. Sp. Pl. 550. Sims in Bot. Mag. t. 1066. Sm. Ins. of Georgia, v. 2. t. 90.—Leaves bipinnate; leaflets smooth, about five. Native of Syria, and common in Spain. Cultivated, in 1656, by Mr. John Tradescant jun. It flowers from June to August. This beautiful tree grows to a large size in warm countries, and is much branched. *Leaflets* ovate, notched, pointed, green above, paler beneath. *Flowers* lateral, in long, loose panicles. Petals white, streaked with pink. *Fruit* oblong, the size of a cherry, of a pale yellow when ripe.—The pulp which surrounds the nut is poisonous, and “in the southern parts of Europe, the nuts are threaded for beads to assist the devotion of good Catholics, for which purpose they are peculiarly suited, having a natural perforation through the centre; hence the tree has been called *arbor sancta*, and by the Spaniards *arbol parayso*.” Sims.

2. *M. sempervirens*. Evergreen Bead-tree. Swartz. Prod. 67. Ind. Occ. v. 2. 737. (*M. Azedarach* β; Linn. Sp. Pl. 550. *Azadirachta indica*, &c.; Com. Hort. Amst. v. 1. 147. t. 76.)—Leaves bipinnate; leaflets somewhat rugose, generally about seven.—A native of the East and West Indies, in which latter country it is called Indian lilac. In separating this from the last species, we have the authority of Swartz, who says that the whole plant is considerably smaller, that the leaflets are of a brighter green, seldom more than seven, somewhat wrinkled, more deeply and unequally serrated and pointed. In addition to these marks of distinction its foliage is not deciduous. The author of the Botanical Magazine has not thought proper to disunite them, but we do not think his reasons conclusive.

3. *M. Azadirachta*. Ash-leaved Indian Bead-tree. Linn. Sp. Pl. 550. Cavan. Diff. t. 208. (*Aria Bepou*; Rheed. Hort. Mal. v. 4. t. 52.)—Leaves pinnate.—A na-

tive of the East. In India, flowering in June and July.—The stem of this tree is large and thick. The wood of a pale yellow; the bark of a dark purple, and very bitter. *Leaves* composed of five or six pairs of oblong, pointed leaflets, terminated by an odd one. These are opposite or alternate, on long footstalks, smelling disagreeably. *Flowers* small, white, lateral, in long, branching panicles. *Fruit* oval, the size of small olives, green, turning yellow, and purple when ripe; its pulp abounds with an acrid and bitter oil, some of which was sent by Dr. Roxburgh to the President of the Linnæan society in 1792, with the character of an excellent vermifuge.

4. *M. dubia*. Cavan. Diff. 364.—Leaves bipinnate, leaflets broadly lanceolate, acute, serrated, the terminal one larger.—Sent by M. Sonnerat to Lamarek from the East Indies.—All that we know of this species is from Cavanilles, who says that he saw a single specimen of it in Lamarek's herbarium without any name, but that he easily discovered it belonged either to *Trichilia* or *Melia*, and that he referred it to the latter genus from its fruit. The flowers resemble those of *M. Azadirachta*.

5. *M. composita*. Willd. n. 5.—Leaves pinnate; lower leaflets ternate, on stalks. Calyx and corolla downy.—A native also of the East Indies.—At the end of Willdenow's description of this species, he says, that *M. dubia* of Cavanilles seems very nearly allied to it.—It occurs nowhere but in the above quoted author, upon whose sole authority we adopt it. The pubescence of the calyx, and outer side of the petals, seems to be the great mark of distinction. The fruit is unknown.

MELIA, in *Gardening*, comprises plants of the deciduous and evergreen exotic tree kinds, of which the species cultivated are; the common bead-tree (*M. azedarach*); the evergreen bead-tree (*M. sempervirens*); and the Indian evergreen bead-tree (*M. azadirachta*.)

Method of Culture.—These different plants are all capable of being increased by seeds, which in the first sort are obtained from abroad, and should be sown in pots of light rich earth in the spring, plunging them in a hot-bed of tanners' bark or dung, under frame and glasses, giving frequent waterings, and fresh air, when the plants are come up, being fully exposed in a moderate shade, during the summer, and placed under a frame in the autumn, &c. to have the free air all winter in open weather, and be sheltered from frost.

But in the following March they should be planted in separate small pots, plunged in a bark-bed, &c. Though this last is not absolutely necessary, yet when practised, it greatly facilitates their rooting and early growth.

After they have been managed in this way for three or four years, and shifted occasionally into larger pots; some of the strongest and most woody plants may be planted out in the full ground under a warm wall, or in a dry sheltered part of the shrubbery. The proper season for this work is the first fortnight in April. And some plants should likewise be placed in pots, to have the management of greenhouse exotic plants, lest those in the open ground should be destroyed by the frost during the winter season.

The seeds in the second and third sorts, should be sown in pots, and plunged in the bark-bed, and managed nearly as the first sort; but, as being much more tender, must be always kept in pots, and plunged in the tan-bed in the store during their early growth; afterwards, when they have acquired considerable size and strength, they may be placed in the open air for a month or two in the heat of summer, but the rest of the year be kept in the hot-house; managing them as other woody exotic stove plants.

It may be noticed that the last sort is not common in the gardens.

In regard to the first sort, it is proper for shrubberies and other parts in warm situations, as well as for the green-house, and the others for stove collections, in mixture with the more tender plants.

MELIA Terra, in *Natural History*, a name given by some authors to the *melinum*, or white earth of the island of Melos, used among the ancients in painting; but in the works of Dioscorides and Galen signifying a substance of a very different kind; the *melinum* of the painters having been a marle, and the *melia terra* of the physicians a tripela.

The terra melia of Dioscorides, and the ancient physicians, is a dry loofe, and harsh earth, found in masses of different size, and lodged among the looser strata of other matter, never making a stratum of itself. It is very firm and hard, of a pale greyish-white or light ash-colour, very heavy, of a loofe, open, and spongy texture, and of a rough uneven, and dusty surface. It adheres slightly to the tongue, and does not stain the hand, and leaves a dust after the handling, which is so harsh as to make a grating noise, when the fingers are afterwards rubbed together. It makes no effervescence with acids. It is found in all the islands of the Archipelago, and was used by the ancients for the same purposes with the pumices.

MELIÆ, in *Botany*, one of Jussieu's Natural Orders of plants, the 71st in his system, or eleventh of his thirteenth class, derives its name from the most familiar genus among them; see *MELIA*. For the characters of the thirteenth class see *GERANIA* and *GUTTIFERÆ*. The following are the characters of *Melia*.

Calyx of one leaf, divided either down to the base, or only at the apex. *Petals* four or five, with broad claws, for the most part cohering at the bottom. *Stamens* of a definite number, either as many as the petals, or more generally double that number, their filaments united into a tube or cup, toothed at its summit, the teeth either bearing the anthers, or overtopping them when attached to their lower part, at the inside. *Germen* single; with a single style; the stigma simple, or, more rarely, divided. *Fruit* either pulpy, or more generally capsular, of many cells, each containing one or two seeds, the valves equal in number to the cells, with partitions from the middle of each valve. The *stem* is shrubby or arboresecent, with alternate branches. *Leaves* alternate, without stipulas, simple or compound.

The first section, with simple leaves, consists of *Canella* of Browne, Swartz and Schreber (*Winterania* of Linnæus and Jussieu), *Symphonia*, *Tinus*, *Geruma* of Forskall (see that article), *Aitonia*, *Quivissa* of Commerçon, and *Turraa*.

The second, with compound leaves, comprises *Ozophyllum* of Schreber (*Ticorea* of Aublet), *Sandoricum* of Rumphius, Schreber and Jussieu, *Portesia* of Jussieu, *Trichilia*, *Elcaja* of Forskall, *Guarea*, *Ekebergia*, *Melia* and *Leca*, which last is also *Aquilicia* of Linnæus. See *LEEA*.

A third section is subjoined by Jussieu, of genera akin to *Melia*. These are *Savietenia* and *Cedrela*. They differ widely from the proper genera of the order in their fruit, which is in both of them a woody capsule of five valves, splitting from the base, and containing numerous, imbricated, compressed, winged seeds.

The order in question is by no means one of the most natural in its learned author's system; at least with respect to the affinities of some of the genera which he has referred to it.

MELIANTHUS, from μέλι, *honey*, and ανθος, *a flower*, so named from the abundance of honey which flows from *M. major* in particular, for, as Linnæus remarks, if that

species be shaken whilst in flower, it distils a shower of nectar. Jussieu tells us that *Meliantbus* is allied to *Tropæolum* in the hood of the calyx, and situation of the petals and stamens; but that it is more like *Didamnum* in habit, fruit, and albumen of the seed. He well remarks however that it is very distinct from either of those genera, on which subject there cannot be the least question. We are told that the Linnæan botanists at Paris used sarcastically to remark that *Meliantbus* was not admitted into the public garden there, because no plausible place could be found for it in the system of the Jussieu.—Linn. Gen. 328. Schreb. 430. Willd. Sp. Pl. v. 3. 402. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 1. v. 2. 367. Tournef. t. 245. Juss. 297. Lamarck Illustr. t. 552.—Class and order, *Didynamia Angiosperma*. Nat. Ord. *Corydalis*, Linn. *Rutaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, large, coloured, cloven into five, unequal segments, the two upper ones oblong, erect, the lowest one very short, bag-shaped, swelling downwards, the intermediate two opposite, interior, lanceolate. *Cor.* Petals four, linear-lanceolate, reflexed at their tips, spreading in a parallel manner, turned outwards, forming a lower lip (as the calyx does an upper one) connected in the centre by their sides. Nectary of one leaf, situated within the lowest segment of the calyx, and adhering with it to the receptacle, very short, compressed at the sides, cut at the margin, and turned downwards at the back. *Stam.* Filaments four, awl-shaped, erect, the length of the calyx, the two lower ones a little shorter; anthers oblong, heart-shaped, four-celled in front. *Pist.* Germen superior, quadrangular, gibbous, four-toothed; style erect, awl-shaped, in length and position like the stamens, stigma cloven into four segments, of which the upper one is the largest. *Peric.* Capsule quadrangular, four-lobed, with acute, distant angles; the cells inflated, their partitions open in the centre to admit the receptacle of the seeds, the valves bursting between the angles. *Seeds* four, somewhat globose, adhering to the centre of the capsule.

Ess. Ch. *Calyx* of five leaves; the lower one gibbous. *Petals* four. Nectary beneath the lowest petal. Capsule four-celled.

1. *M. major*. Greater Honey-flower. Linn. Sp. Pl. 892. (*M. africanus*; Herm. Lugd. t. 415.)—Stipulas foliary, adhering to the leaf-stalk.—Discovered by Hermann at the Cape in the year 1672. It flowers in greenhouses from May to July.—*Root* perennial, woody, spreading. *Stems* numerous, four or five feet high, herbaceous towards the top. *Leaves* pinnate, embracing the stem, greyish, composed of about three or four pairs of ovate, deeply-toothed leaflets, three or four inches long, with an odd one; a leafy, jagged border or wing running along the mid-rib connects them at their base. *Flowers* in a longish spike; springing from between the leaves towards the top of the stalks, of a brown or chocolate colour.

2. *M. minor*. Lesser Honey-flower. Linn. Sp. Pl. 892? Curt. Mag. t. 301.—Stipulas in pairs, but separate. Clusters axillary, elongated. Bractæas linear, tapering.—Native of the Cape, and cultivated in 1708 by the dukes of Beaufort.—*Stems* four or five feet high, branched, soft, round, woody. *Leaves* about half as large as in the preceding, green on the upper side, whitish beneath. *Flowers* six or eight in a cluster, very ornamental, variegated with green, yellow and red or pink.—Mr. Curtis observes that the foliage when bruised has an unpleasant smell; that the secreted honey or nectar does not flow so copiously from this as from the last which is more common, but that it exhibits rather an unusual phenomenon, being retained in the lower part of the blossom, and of a dark brown colour.

3. *M. comofus*. Tufted Honey-flower. Willd. n. 3. (*M. africanus minor foetidus*; Comm. Rar. t. 4.)—Stipulas distinct. Clusters below the leaves. Flowers alternate. Bractles heart-shaped. Leaves hairy above.—A native also of the Cape. Stem upright, branched, four feet high, round. Leaves pinnate, consisting of about five pairs of linear, deeply toothed, soft leaflets with an odd one, hoary underneath. Flowers in pendent clusters, on short stalks, of a yellow colour.

MELIANTHUS, in *Gardening*, comprehends plants of the perennial exotic kind, of which the species cultivated are, the great honey-flower (*M. major*); and the small honey-flower, (*M. minor*.)

Method of Culture.—These two species of plants may be increased by suckers from the roots and cuttings of the young stalks or branches. The first sort is, however, best raised by planting the suckers, or side-shoots, any time in the spring or summer seasons, choosing such as are furnished with root fibres, in pots, or the places where they are to remain, which, after they are planted and have taken root, require little further care, but to keep them clean from weeds. The cuttings may be planted during any of the summer months, due water and shade being given. When they have taken root they should be planted out where they are to remain, or in separate pots, to be managed as green-house plants.

But the second sort is raised with more difficulty, and chiefly from cuttings, which should be planted upon an old hot-bed, the heat of which is over, and covered close with bell or hand-glasses to exclude the air. When they have taken root they may be planted out in pots, and sheltered in the winter under a frame for a year or two, till they are become strong, after which they may be set out in a warm border, and be managed in the same manner as the first sort. And they succeed best in a dry soil and warm situation; but some plants should always be kept in pots and treated as greenhouse plants, lest those in the open ground be destroyed by severe froils.

All of them afford ornament and variety in the borders and clumps, as well as among other plants in greenhouse collections

MELIBCEA, in *Ancient Geography*, a town of Greece, in the part of Thessaly called Magnesia, about the precise situation of which authors differ. Strabo places it in a gulf, on the eastern coast, between mount Ossa to the N. and mount Pelion, somewhat farther from the coast, lying from N.W. to S.E.

MELIBCEUS MOUNTS, a mountain of Germany, which, according to Cæsar (Bell. Gall. l. vi. c. 1.) formed a separation between the Cherusci and Suevi. It was part of those mountains which covered the forest Bacenis.—Also, a mountain of Italy.

MELICA, in *Botany*, a name supposed by Ambrosinus to be corrupted, either from *Miliaca*, which might express the likeness of the grass so called, to *Milium*; or from *Melinis*, the name of some sort of *Panicum*, which it also resembles in the aspect and distribution of the blossoms.—Linn. Gen. 34. Schreb. 48. Willd. Sp. Pl. v. 1. 381. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 91. Ait. Hort. Kew. ed. 2. v. 1. 152. Juss. 31. Lamarck Illustr. t. 44. Gært. t. 80.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* A glume of two ovate, concave, nearly equal valves, containing two flowers. *Cor.* of two ovate awnless valves, one of which is concave, the other flat and smaller. A turbinate stalked body, consisting of two abortive florets, stands between the two perfect ones. Nectary

of one fleshy horizontal leaf, surrounding the germen. *Stam.* Filaments three, capillary, thickened and united at their base, as long as the flower; anthers oblong, forked at each extremity. *Pist.* Germen superior, obovate, turbinate; styles two, bristle-shaped, spreading, naked at their base; stigmas oblong, feathery. *Peric.* none, except the corolla, which is not united to the seed. *Seed* one, ovate, with a longitudinal furrow at the upper side.

Obf. The stalked body between the florets is considered by Linnæus as affording an essential character. This consists of the abrupt rudiments of two other florets, placed in an alternate order, their glumes convolute and pellucid. To this Schrader adds that the stamens of the real florets are dilated and combined at their base, and that the nectary is of a single leaf.

Ess. Ch. Calyx of two valves, containing usually two florets, with the rudiment of more between them. Corolla of two valves, unconnected with the seed.

An elegant genus of grasses, of which Willdenow has thirteen species, three of them British. To these we add two gathered by Dr. Sibthorp in Greece, a third from America, and a fourth from the East Indies. The habit of the whole genus, well marked in some species, is not so uniform throughout the whole as could be wished. Neither is the number of perfect or of abortive florets constant in all.

1. *M. ciliata*. Fringed Melic-grass. Linn. Sp. Pl. 97. Sm. Fl. Græc. Sibth. v. 1. 54. t. 70. (Græmen montanum, avenæ femine; Clus. Hist. v. 2. 219.)—The outer petal of the lower floret fringed.—Native of dry stony ground in the south of Europe. With us it is sometimes kept in gardens for the sake of its long white plumpy spiked panicles. The root is perennial, tufted and knotty. Stems two or three feet high, erect, round, smooth, stiff, bearing several narrow rigid leaves. Panicle terminal, solitary, erect, close and cylindrical, from two to six inches long. Calyx containing only one perfect, and one abortive, floret. The glumes are membranous and whitish. Stamens long. Fringe of the corolla long, dense, and very remarkable.

2. *M. gigantea*. Gigantic Melic-grass. Thunb. Prod. 21. (Aira villosa; Linn. Suppl. 109.)—“Corolla hairy, awned. Panicle whorled. Stem erect.”—Found by Thunberg at the Cape of Good Hope. The root is crowned with ovate-oblong hairy scales. Stem smooth. Leaves flat, tapering, with frequently shaggy sheaths. Panicle terminal, a foot long. Florets two, large, rusty; one of them smaller, and rather imperfect. Corolla hairy, with a short, straight, terminal awn.

3. *M. geniculata*. Bent-stalked Melic-grass. Thunb. Prod. 21.—“Corolla hairy. Panicle compact. Stem decumbent.”—Native of the Cape.

4. *M. decumbens*. Decumbent Melic-grass. Thunb. Prod. 21.—“Corolla hairy. Flowers racemose, drooping. Stem decumbent.”—From the same country. This must not be confounded with *M. decumbens* of Weber, which is *Fesluca decumbens* of Linnæus, *Poa* of Fl. Brit. 107.

5. *M. racemosa*. Racemose Melic-grass. Thunb. Prod. 21.—“Corolla hairy. Clusters drooping. Stem erect.”—From the Cape. We have seen no specimens of the last four species.

6. *M. minuta*. Slender Melic-grass. Linn. Mant. 32. Willd. n. 10. (*M. pyramidalis*; Desfont. Atlant. v. 1. 73. *M. nutans*; Cavan. Ic. v. 2. 58. t. 175. f. 2?)—Stem branched. Leaves setaceous. Petals beardless. Panicle simple, drooping.—Native of Italy, Spain, Greece and Cyprus.—This is an extremely slender smooth grass, scarcely a foot high. The stems are in our specimens, as Linnæus describes them, very much branched. Cavanilles

MELICA.

says they are always simple. *Leaves* extremely narrow, perfectly setaceous when dry, from the inflexion of the edges; the long sheath crowned by a membranous *stipula*. *Panicle*, or rather *cluster*, simple, of a very few drooping flowers. The *calyx* contains two perfect florets, and the stalked rudiments of one or two others. All the *glumes* are obtuse and ribbed; the *corolla* minutely downy, but not fringed or bearded.

7. *M. saxatilis*. Rock Melic-grafs. Sm. in Prod. Fl. Græc. Sibth. v. 1. 51. Fl. Græc. t. 71. (*M. aspera*; Desfont. Atlant. v. 1. 71? Gramen avenaceum saxatile; paniculâ sparsâ, locustis latioribus candicantibus et nitidis; Tourn. Inst. 524?)—Stem simple. Petals beardless. Panicle close, directed one way. Flowers drooping. *Stipula* elongated.—Frequent on rising ground in the islands of the Archipelago. It has the habit of the last, but is much larger in every part, and the *stems* are simple, *panicle* of a much greater number of *flowers*, with sharper *glumes*. The *panicle* agrees with that of the British *M. nutans*, hereafter mentioned, but the *foliage* is narrower, and the *stipula* more elongated than in that species. There is some reason to suspect the synonym of Cavanilles, which we have cited for the foregoing, may belong to this; but no stress can be laid on his delineations of the minutest parts.

8. *M. nutans*. Mountain Melic-grafs. Linn. Sp. Pl. 98. Curt. Lond. fasc. 6. t. 4. Engl. Bot. t. 1059. Knapp. t. 42. Mart. Rust. t. 65. (*M. montana*; Hudf. 37.)—Petals beardless. Panicle compact, leaning one way, nearly simple. Flowers drooping. Calyx two-flowered. Leaves flat.—Found in mountainous woods, chiefly in the north of Europe. With us it is confined to Westmoreland and the north-west part of Yorkshire, where it flowers in the early part of summer. The *root* is fibrous and perennial. *Stems* several, above a foot high, leafy, slender and naked above, with rough angles. *Leaves* lanceolate, flat, rough-edged, with a long rough sheath, and a very short jagged *stipula*. *Panicle* long, erect or slightly incurved, almost always simple, of many elegant purplish pendulous *flowers*, leaning one way. *Florets* two, with the unequal rudiments of two more. *Glumes* bluntish, with a white membranous termination. The *nectary* in this species answers to Schreber's description, but scarcely, we fear, in all.

9. *M. uniflora*. Wood Melic-grafs. Retz. Obf. fasc. 1. 10. Curt. Lond. fasc. 5. t. 10. Engl. Bot. t. 1058. Knapp. t. 41. Mart. Rust. t. 64. (*M. Lobelii*; Villars Dauph. v. 1. 89. t. 3. *M. nutans*; Hudf. 37.)—Petals beardless. Panicle branched, leaning one way. Flowers erect. Calyx single-flowered. Leaves flat.—Common in groves and bushy places in England and most parts of Europe, flowering in May and June, when its little red tumid flowers, trembling upon the divaricated wiry stalks of the panicle, make a very pretty appearance. The *root* is fibrous and perennial. *Stems* simple, a foot and half high, slender. *Leaves* flat and broadish, thin, bright green, rough at the back and edges, with a downy sheath and short variously-shaped *stipula*. *Panicle* of not many flowers; its lower branches two together. The single fertile *floret* is oval, tumid, with ribbed green *glumes*; the barren one likewise solitary, on a thick inflexed stalk.

10. *M. major*. Greater Melic-grafs. Sm. Prod. Fl. Græc. Sibth. v. 1. 51. (*M. n.* 31; Gmel. Sib. v. 1. 99. t. 19. f. 1.)—Petals beardless. Panicle spreading; with branches in pairs. Flowers drooping. Stem simple. Leaves involute and pungent.—Native of Greece, France, and Siberia, in mountainous places. There is some reason to suspect this species to be what Dr. Sibthorp took for *M. nutans*, and put down as such in his lists of Greek plants,

the latter not being found in his herbarium, nor this noticed by any other appellation. The plants however are very distinct. The *major* has a branched panicle, more like the *uniflora*, but the *calyx* contains from two to four florets, besides an abortive one, their *corolla* mostly bristly at the back. The *leaves* are flat when growing, but rolled in when dry, with a sharp rigid point. We believe this has been called *M. amethystina* by the abbè Pourret.

11. *M. ramifl.* Branched Cape Melic-grafs. Thunb. Prod. 21.—“Petals smooth, beardless. Panicle compact. Stem branched.”—Gathered by Thunberg, at the Cape of Good Hope.

12. *M. capensis*. Spreading Cape Melic-grafs. Thunb. Prod. 21.—“Petals smooth, beardless. Panicle widely spreading. Leaves nearly thread-shaped.”—From the same country. We have seen neither of these last, but their characters mark them as very distinct.

13. *M. papilionacea*. Fly Melic-grafs. Linn. Mant. 31. Willd. n. 12. (*M. brasiliensis*; Arduin. Spec. 2. 17. t. 6. f. 1, 2.)—Panicle close. Outer valve of the calyx very large, obovate, coloured. Outer petals with toothed ribs, somewhat hairy.—The seeds of this curious grass were sent from Brazil to Arduino, who raised them at Padua in 1756, and thinking it might form a new genus, as appears by his specimen, sent it to Linnæus, who justly referred it to *Melica*. Commerçon gathered the same at Monte Video. The *stems* are eighteen inches high, simple, erect. *Leaves* broadish, somewhat involute in drying, their sheaths crowned by a long cloven *stipula*. *Panicle* branched, but compact. *Flowers* erect, remarkable for the large purple outer glume of their *calyx*, which embraces the whole of the spikelet, the inner glume being elevated on the stalk within, much narrower and more rigid, like the *corolla*, whose outer glumes have very strong, tuberculated, and somewhat hairy, ribs. The *florets* are two with one or two abortive ones.

14. *M. altissima*. Tall Melic-grafs. Linn. Sp. Pl. 98. Hoff. Gram. Austr. v. 2. 8. t. 9. Ehrh. Calam. 71. (*M. n.* 30. Gmel. Sib. v. 1. 98. t. 20.)—Panicle close, many-flowered. Calyx-glumes obovate, nearly equal, rather shorter than the florets. Outer petals roughish, beardless. Leaves lanceolate, broad.—Native of Siberia. A tall and very handsome grass, with flat *leaves* half an inch in breadth, and a very long, upright, close, branched *panicle*, compound of innumerable crowded purple *flowers*, turned to one side. The above specific character distinguishes it from the last, which it much resembles at first sight.

15. *M. glabra*. Smooth American Melic-grafs. Michaux Boreal-Amer. v. 1. 62. (*M. altissima* et *mutica*; Walt. Carol. 78? Michaux. Gramen avenaceum, locustis rarioribus muticis, virginianum majus; Morif. v. 3. 216. sect. 8. t. 7. f. 51.)—Panicle widely spreading, with branches in pairs. Flowers erect. Calyx-glumes elliptical, nearly equal, rather shorter than the florets. Petals smooth, beardless. Leaves linear.—Native of North America, from Virginia to Florida. Michaux. Linnæus referred the synonym of Morison to his *altissima*, having probably never seen the present species, which differs from that in its narrower *leaves*, spreading *panicle*, and smooth *flowers*. The *stem* is two or three feet high. Willdenow, who cites this as a variety of the last, still expresses his opinion of its being undoubtedly a different species.

16. *M. cærulea*. Purple Melic-grafs. Linn. Mant. 2. 325. Ehrh. Calam. 91. Curt. Lond. fasc. 5. t. 11. Engl. Bot. t. 750. Knapp. t. 40. (*Aira cærulea*; Linn. Sp. Pl. 95. Hudf. 33. Fl. Dán. t. 239.)—Panicle close, much branched. Flowers erect, cylindrical. Calyx-glumes much shorter than the florets. Petals acute, angular, smooth and beardless

beardless—Native of various parts of Europe, generally on the most barren sandy moors, or inundated heaths, flowering in August. This is a very coarse rigid useless grass, varying greatly in height and luxuriance according to the soil. Its habit is reed-like. *Leaves* taper-pointed and pungent, involute in drying, of a glaucous aspect, broad and sheathing at the base, with hairs in the place of a *stipula*. *Panicle* erect, cleft, repeatedly branched, consisting of numerous, small, upright *flowers*, of a bluish-purple hue, pale when growing in the shade. *Calyx* of two unequal ovate, acute valves. *Florets* four, elongated, much exceeding the calyx, acute, angular rather than ribbed, smooth and beardless, the two lower ones only complete and fertile. *Anthers* violet, almost black. The habit of this is very dissimilar to all the foregoing, and its flowers in particular more resemble the next.

17. *M. diandra*. Broad-leaved Diandrous Melic-grass. Roxb. MSS.—Panicle corymbose, of numerous, slender, many-flowered branches. *Flowers* erect, ovate. Glumes all sharp-pointed, keeled, smooth. *Leaves* ovato-lanceolate, reticulated.—Native of Calcutta. This has the habit of *Arundo Phragmites*. The stem is clothed with several alternate, broad, lanceolate, acute leaves, somewhat ovate at their base, with long, fringed, close sheaths. They have rough edges, and many ribs, connected by transverse reticulations. The panicle is level-topped, composed of numerous, slender, close, racemose branches. *Flowers* purplish, shining, smooth, rather smaller, as well as more compressed, than in the last, all their glumes very sharp-pointed. By the name we presume there are but two *flamens*. The inner *petal* seems to be coarsely fringed, at least in the upper and imperfect floret.

M. Falx, Linn. Suppl. 109, is referred by Thunberg to *Cynofurus*, see *C. Falcatu*, sp. 4. He is followed by Willdenow, and the habit as well as characters of this very curious grass strongly justify the measure.

MELICA is also a word used by the ancients as the name of a food of a refrigerating and moistening quality. It seems to have been a kind of *oxygala*; for Galen, when he directs persons of a hot habit to use a refrigerating diet, among other aliments of that kind, directs the eating of melica, which, he says, is prepared of milk. Constantine, in his book of agriculture, mentions melica, and says it was made by pouring milk into an earthen vessel, first well impregnated with boiling hot vinegar, by means of which there was a separation of the milk into whey and curd.

MELICE'RIA, or MELICÉRTOLA, in *Surgery*, a small encysted tumour, the contents of which are of the consistence of honey.

MELICE'RIS, (from *μελι*, honey, and *κηρος*, wax), an encysted tumour, filled with matter, that has the appearance and consistence of honey. See TUMOUR.

MELICHRUS, in *Botany*, from *μελιχρος*, honey-coloured, alluding, we presume, to the colour of the flowers; especially as the masculine gender is adopted in the specific names. Otherwise the latter would have been, as usual, feminine, *μελιχρα*, or *herba*, being understood.—Brown. Prod. Nov. Holl. v. 1. 539.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Epacridæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of many leaves, erect, permanent; the five innermost longest, equal, lanceolate, concave. *Cor.* of one petal, wheel-shaped, or pitcher-shaped, in five equal segments, bearded half way, and with five clusters of glands near its base. Nectary a glandular, nearly entire, cup, surrounding the base of the germen. *Stam.* Filaments five, thread-shaped, equal, inserted into the base of the corolla; anthers incumbent, oblong, bursting lengthwise,

slightly projecting. *Pist.* Germen superior, roundish; style columnar; stigma capitate. *Peric.* Drupa nearly dry, with a hard shell. *Nut* of five cells. *Seed* solitary?

Eff. Ch. Outer calyx of many leaves. Corolla five-cleft, wheel or pitcher-shaped, bearded half way, with five clusters of glands near the base. Drupa dry, of five cells.

This genus consists of two species of small shrubs, which are procumbent, or nearly so, with lanceolate leaves. The flowers are axillary, solitary, erect.

1. *M. rotatus*. Br. (*Vintenatia procumbens*; Cavan. Ic. v. 4. 28. t. 349. f. 1.)—Corolla wheel-shaped. Calyx hairy. Leaves nearly linear, hairy on both sides and at the edges.—Native of New South Wales, as well as of the tropical part of New Holland. The stem is much branched, procumbent. Branches clothed with several rows of imbricated, linear-lanceolate, acute, entire leaves, about an inch long, somewhat glaucous, clothed and fringed with soft hairs, and striated with numerous ribs. Flowers numerous, axillary, solitary, sessile. Calyx loosely covered with long, soft, white hairs. Segments of the corolla acute, broad at the base; Cavanilles represents them much too narrow; each is bearded with long hairs from beyond the middle to the point. There appears to be more of a tube than properly belongs to a wheel-shaped corolla, but our specimens are not sufficient to determine that point.

2. *M. urceolatus*. Br.—Corolla pitcher-shaped. Calyx smooth. Leaves lanceolate, taper-pointed, minutely toothed.—Gathered near Port Jackson by Mr. Ferdinand Bauer.

The other species of *Vintenatia*, *humifusa*, Cavan. Ic. v. 4. 28. t. 348, is referred by Mr. Brown to a distinct genus, *Astroloma*, Prod. Nov. Holl. v. 1. 538, in which the tube of the corolla is inflated, and twice the length of the calyx; its limb short, spreading, bearded. These differences are by no means strikingly indicated in Cavanilles' figures, nor do they there appear to us sufficient to divide plants in other respects so nearly alike. We can indeed judge but imperfectly from dried specimens, or from such delineations. Neither can we account for the spelling of the name, which was intended to commemorate the late M. Ventenat.

MELICOCCA, from *μελι*, honey, and *κοκκος*, a berry, so named by Dr. Patrick Browne from the sweetness or mellowness of its fruit.—The Genip Tree.—Browne Jam. 210. Jacq. Amer. 108. Linn. Gen. 188. Schreb. 254. Willd. Sp. Pl. v. 2. 330. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 350. Swartz Obs. 144. Juss. 248. Lamarck Illustr. t. 306. Gærtner. t. 42.—Class and order, *Obandria Monogynia*. Nat. Ord. *Tribilata*, Linn. *Sapindi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of four, ovate, concave, obtuse, spreading leaves. *Cor.* Petals four, oblong, equal, reflexed between the calyx-leaves. *Stam.* Filaments eight, awl-shaped, erect, short; anthers oblong, erect. *Pist.* Germen superior, ovate, nearly the length of the corolla; style very short; stigma large, rather peltate, extended at each side, oblique. *Peric.* Drupa covered with a tough skin, roundish, obtusely pointed. *Seed* a leathery, roundish, smooth nut.

Obs. In Gærtner's description of *Melicocca* the *Pericarp* is said to be an ovate, pointed, leathery, thickish Berry, of one cell. The seeds solitary (rarely two or three), ovate, furrowed on one side, coated with a glutinous pulp.

Eff. Ch. Calyx deeply four-cleft. Petals four, reflexed between the calyx-leaves. Stigma shield-like. Drupa with a tough coat.

1. *M. bijuga*. Genip Tree, or Honey-berry. Linn. Sp. Pl. 495. Jacq. Amer. t. 72. (*Nux americana*, foliis aiatis bifidis; Comm. Hort. v. 1. 183. t. 94.)—A native of South America and cultivated in the East Indies. Introduced into this

this country in 1778 by Dr. Thomas Clarke. We learn from Browne's History of Jamaica that this tree was brought to that island from Surinam. He calls it Genip tree from the Dutch *Knippen*. The Spaniards term it *Monos*. Jacquin mentions it as growing wild about Carthage, and commonly cultivated at Curaçao. The stem of this tree rises to nearly twenty feet in height, and has numerous spreading branches. Leaves abruptly pinnate, on round, elongated, or rather compressed stalks, consisting of two pair of nearly sessile, ovate leaflets, acuminate at both ends, entire, nerved, smooth, bright green. Flowers in terminal, compound clusters of a yellow colour. Fruit about twice as large as a nutmeg, containing a sweet, acid, gelatinous substance like the yolk of an egg.

"Jacquin was informed at Curaçao that this genus was diacious, but Swartz ascertained it to be polygamous, one tree bearing perfect flowers, another only male ones; the latter is most common and bears the finest flowers; they expand in April and the fruit ripens about Midsummer."

MELICOPE, a name constructed by Forster, from μέλι, honey, and κοπή, an incision, the nectary being composed of a series of notched glands. Forst. Gen. t. 28. Schreb. 257. Willd. Sp. Pl. v. 2. 346. Mart. Mill. Dict. v. 3. Juss. 429. append. 453. Lamarck Dict. v. 4. 60. Illustr. t. 294. (Entoganum; Banks and Soland. MSS. Gært. t. 68.)—Class and order, *Oständria Monogynia*.—Nat. Ord. *Rutaceae*?

Gen. Ch. Cal. Perianth inferior, of one leaf, in four deep, equal, roundish segments, permanent. Cor. Petals four, equal, ovate-oblong, with a little blunt point, keeled, broad at the base, slightly spreading. Nectary of four large cloven glands, encompassing the base of the germen. Stam. Filaments eight, awl-shaped, equal, simple, smooth, shorter than the petals, inserted into the receptacle on the outside of the nectary; anthers terminal, erect, oblong, somewhat heart-shaped, simple, of two cells. Pist. Germen superior, ovate, four-lobed; style quadrangular, short; stigma dilated, quadrangular, umbilicated. Peric. Capsules four, elliptical, compressed, spreading, of one cell, opening at the upper margin. Seeds solitary, compressed, smooth, stalked.

Eff. Ch. Calyx in four deep segments. Petals four. Nectary of four cloven glands round the germen. Stamens simple. Stigma dilated. Capsules four, single-seeded.

1. *M. ternata*. Forst. Prod. 28. (Entoganum lævigatum; Gært. v. 1. 331.)—Gathered by Forster in New Zealand. The only known species. A shrub, with smooth, round, leafy branches; the young ones somewhat quadrangular. Leaves opposite, stalked, ternate; leaflets an inch or inch and a half long, obovate, bluntly pointed, very obscurely and irregularly crenate, rather thickened or bordered at the margin, tapering at the base, single-ribbed, with a few oblique forked veins, quite smooth, of a pale green when dry, full of small, pellucid, resinous dots; the terminal leaflet larger than the rest. Common footstalk about an inch long, linear, channelled, smooth. The lower leaves on each branch are simple, and smaller. Stipulas none. Flower-stalks axillary, solitary, shorter than the leaves, forked, or perhaps somewhat corymbose, smooth, slightly angular, with a pair of minute, concave bractæ at each subdivision. Whenever any of the stalks fall off, a broad pale peltate scar is left behind on the branch. Flowers about a quarter of an inch in diameter, white or yellowish, each on a quadrangular partial stalk, a quarter of an inch long, dilated upwards under the calyx. Capsules spreading in four directions, somewhat leathery, smooth, each a quarter of an inch long.

Of this very little-known shrub we have seen but one mutilated specimen, given by Forster to Linnæus. Nothing is

said by the author of the genus, any more than by Solander or Gærtner, to indicate its affinity to any other, nor could Jussieu form even a conjecture on the subject. The shape, and resinous dots, of the leaves, as well as the pallid hue which they, like the other parts, assume in drying, and even the aspect of the flowers, whose petals are full of resinous dots, all seem to indicate the natural order of *Aurantia*. But these characters, except perhaps the pale colour, equally belong to the *Rutaceae*, at least to those genera which are subjoined by Jussieu to that natural order, and of which *Diopsia* is the type; and the fruit strongly confirms the propriety of referring *Melicope* to them. With these Jussieu was but slightly acquainted. There are numerous genera of this tribe in New Holland (see *CORRÆA*, *CROWEA*, *ERIOSTEMON*); as well as *Boronia*, Sm. Tracts 287. t. 4—7, and *Tetratheca*, Sm. Exot. Bot. t. 20—22. The inflorescence of the genus before us, as far as can be discovered from our bad specimen, seems very nearly that of *Boronia pinnata*, Andr. Repof. t. 58. Its simple filaments and anthers, and, according to Gærtner's description, the want of an arillus to the seeds, are circumstances in which it differs from *Boronia* and most of its allies. The flavour of the dried leaves is a little bitter, scarcely aromatic. S.

MELICUCCA, in *Geography*, a town of Naples, in Calabria Ultra; 10 miles W.S.W. of Oppido.

MELICYTUS, in *Botany*, so named by Forster, from μέλι, honey, and κύτος, a cavity or cell, alluding to the five oblong bodies, hollowed out at their summits, which he conceived to be nectaries bearing the anthers. Forst. Gen. t. 62. Schreb. 685. Mart. Mill. Dict. v. 3. Juss. 428. Lamarck Dict. v. 4. 59. Illustr. t. 812. Gært. t. 44. Class and order, *Diocia Pentandria*. Nat. Ord. *Euphorbiæ*?

Gen. Ch. Male, Cal. Perianth very short, with five teeth. Cor. Petals five, equal, ovate, acute, widely spreading, longer than the calyx. Nectary of five club-shaped bodies, hollowed out at the top, erect, bearing the stamens at their inside. Stam. Filaments none, except the nectaries be so considered; anthers five, roundish-ovate, with four furrows in front, attached lengthwise to the inner side of the nectaries, and extending slightly beyond them.

Female, Cal. and Cor. as in the male. Nectary of five triangular acute scales, shorter than the calyx, surrounding the germen closely at its base. Pist. Germen ovate; style none; stigma of four or five small, flat, rounded lobes. Peric. Capsule pulpy, globose, smooth, coriaceous, of one cell, with four or five valves. Seeds about five, convex on one side, angular on the other, lodged in pulp.

Eff. Ch. Male, Calyx with five teeth. Petals five. Nectary of five hollow-tipped bodies, bearing the stamens.

Female, Cal. and Cor. as in the male. Nectary of five scales round the germen. Stigma sessile, four or five-lobed. Capsule pulpy, of one cell and five valves. Seeds five.

1. *M. ramiflorus*. Forst. Prod. 70.—Native of the neighbourhood of Queen Charlotte's Sound, New Zealand, flowering there in November. A shrub, or tree, with round, smooth, leafy branches. Leaves deciduous, scattered, on short smooth footstalks, elliptic-lanceolate or obovate, obtuse, bluntly serrated, smooth on both sides, with one rib and numerous interbranching reticulated veins, each leaf an inch and a half or two inches long, and nearly one broad. Flower-stalks several together, from scattered lateral or axillary buds, each about a quarter of an inch long, swelling upwards, simple, smooth, bearing about the middle a minute fringed concave bractæ, single-flowered. Flowers very minute, whitish.

Jussieu knew not where to place this genus in his natural orders, but was led by its artificial characters, as it seems,

to suppose it akin to *Astronium* of Jacquin and Linnæus. Gartner having the fruit, which Forster knew nothing of, more happily perceived its relationship to *Kiggelaria*. (See that article, and *ASTRONIUM*.) This relationship has induced us to refer *Melilotus* to the *Euphorbia* of the great French botanist, notwithstanding the presence of petals, which that natural order, it seems, ought to be without. We cannot however be too far led by hypothesis as to deny real petals to *Kiggelaria*.

MELIDES, in *Geography*, a town of Portugal, in the province of Estremadura; 21 miles S. of Setúval.

MELILITE. This scarce mineral substance has hitherto been found only in minute but very regular cubic or parallelepipedic crystals: they are of the size of a millet seed, of a yellow colour, and externally covered by a brownish or gold yellow crust of iron ochre. Their hardness is sufficient to scratch steel.

The melilite melts before the blowpipe, without effervescence, into a transparent solid glass of a greenish colour. Its powder forms a transparent jelly with nitric acid. It is not pyro-electric.

By these characters this microscopic mineral is sufficiently distinguishable from mesotype, stilbite, chabasie, and analcime, to which it bears some distant resemblance.

The cubic crystals of the melilite pass into the cuneiform octahedron.

These small crystals were discovered by M. Fleurieu de Bellevue in the fissures of a black, pretty compact lava, known under the name of *silex romano*, found at Capo di Bove, near Rome. They are accompanied by small, white, transparent, acicular crystals, which appear to belong to sommitte or nepheline. Brongn.

MELILLA, or MELELA, in *Geography*, a town of Africa, in the kingdom of Fez, situated on the coast of the Mediterranean, and belonging to the Spaniards. It was probably founded by the Carthaginians, and seems to have derived its name from the honey produced in its environs. The town is strongly fortified and surrounded by the sea. The only communication with the main land, inhabited by the Moors, is by a draw-bridge. It was abandoned by the Goths when the Arabs invaded the country, and being deserted by the Moors, was seized on by the Spaniards about the beginning of the 15th century. This town has large magazines and cisterns for preserving the water. The number of inhabitants is estimated at 2000; 140 miles E of Tetuan. N. lat. 35° 24'. W. long. 2° 54'.

MELILLI, a town of Sicily, situated on mount Hybla, famous for its excellent honey, to which it owes its name; as well as also to the fertility of the adjacent territory, or the sugar-canes once cultivated there, but now abandoned.

MELILOBUS, in *Botany*. (from *μῆλις*, honey, and *λοβός*, a pod, or legume, alluding to the sweet pulp in which the seeds are lodged,) the original name given by Mitchell to the *Gleditsia* of Clayton and Linnæus, and undoubtedly a very expressive one. It is much to be wished that such should always have a preference; and that no genus should ever be consecrated to any botanist, till an expressive name, of Greek or Latin derivation, had first been sought in vain. But alas! this is like wishing for honesty and disinterestedness in those who elect, and those who are elected.

MELILOT, a species of trefoil, or *trifolium*; which see. (See MELILOTUS.) This plant grows wild in most parts of Europe, in corn-fields, pastures, and by way-sides. Among bread-corn it is a troublesome weed; and ripening about the same time with the corn, is often ground with it, being difficult to separate from it: in such a case it spoils the bread,

or whatever the flour is used for, by giving it a strong taste, like the plaster made from it.

Melilot is scarcely ever given internally; but used externally, it was formerly esteemed emollient and digestive, and was employed as an ingredient in cataplasms, fomentations, and blister-plasters; but it is now laid aside as being rather acid and irritating than emollient. The flowers have been recommended by some in infusion, in the manner of those of chamomile, as a remedy for the fluxus albus. It formerly gave the name to one of the official plasters, which received from the melilot a green colour and an unpleasant smell, without any addition to its efficacy.

MELILOTUS, *μολιότος* of Dioscorides, appears to be the *Trifolium Melilotus-officinale* of Linnæus, which Dr. Sibthorp found growing wild, in low moist situations, in Attica and different parts of Greece. This ingenious and learned traveller suspected the other kind, which is mentioned by the above Greek writer as of a yellower colour and weaker scent, and growing about Nola in Campania, might be *T. Melilotus-italica*, which is found on the dry ground of Mount Hymettus, near Athens. Dr. Sibthorp observed the figure in the famous ancient manuscript at Vienna, to be evidently intended for one of these species.

MELIN, in *Geography*, a town of Croatia; 12 miles S.S.W. of Varasdin.

MELINDA, a kingdom of Africa, situated near the coast of the Indian sea. This country is for the most part fertile, producing almost all the necessaries of life, except wheat and rice, for want of which, those who cannot purchase them are supplied with potatoes, which are here large and plentiful. They abound with other roots and fruits, and with melons of excellent quality. Citrons here are abundant, and agreeably perfume the air during the greatest part of the year. They have also plenty of venison, game, oxen, sheep, geese, and other poultry; and a breed of sheep, whose tails weigh in general between twenty and thirty pounds. The men are black, swarthy, tawny, and white, and the women chiefly of an olive colour; their dress is elegant, consisting of fine silks, girt with rich gold or silver girdles, collars, and bracelets, and their heads are covered with veils. The men wear a kind of turban; and in other respects their dress consists of a piece of cotton wrapped round the middle, and reaching below the knees, the other parts of the body being naked. Those of the meaner class, and such as live in the interior of the country, wear little else besides a piece of cloth about their middle, except their shield and military weapons, which are the bow and arrows, the scymetar, and the javelin. Their religion is chiefly Mahometan; with a mixture of idolaters; and their government is monarchical, the king being treated with great respect and veneration by his subjects: and accompanied with attendants, who present him with incense and perfumes, whenever he goes abroad, and ladies who pay their homage to him with songs and several kinds of musical instruments. The prince of this country was formerly tributary to the Portuguese; but they are now obliged to purchase, by annual presents, permission to trade, and to search for gold. Adjoining to Melinda are five other kingdoms, to which the connection and influence of the Portuguese extend. The natives, besides their commerce with the Portuguese, carry on some trade with their own vessels, in which they frequent the Red sea, and Arabian ports; and they sometimes traverse the Indian seas, as far as Cambaya, in the territories of the great Mogul. On the other hand, the Arabians and Indians bring goods to Melinda: but the whole trade, which is little inferior to that of Mozambique, is ultimately transacted with the Portuguese.

tuguefe. The articles brought to Melinda are gold from Sofala; as well as ivory, copper, quicksilver, all forts of filks and cottons from Europe and the East Indies, together with spices, rice, and other grain.

MELINDA, the capital of the above-described kingdom, pleasantly situated on a beautiful plain near the coast of the Indian sea, and furrounded by fine gardens and orchards, producing all forts of fruit-trees, especially citrons and oranges. The houfes are built of square stone, many of them being constructed in a magnificent style, and all richly furnished, for the stated residence of rich merchants, and the occasional resort of foreigners, who carry on an extensive commerce in gold, copper, quicksilver, ivory, wax, and drugs, in exchange for silk, cottons, linen cloths, corn, and other commodities. The harbour is difficult of access, on account of rocks and shelves that intercept the approach to it, and obligé vessels to come to anchorage at some distance from it. The warehoufes at Melinda supply the country with European goods to a great distance within land, where they procure vast quantities of ivory. This city was wholly built by the Portuguese, and is said to contain 30,000 Portuguese, besides natives; and includes seventeen Christian churches, together with other religious houfes. S. lat. 3° 5'. E long. 42° 40'.

MELINDA, one of the Querimba islands, in the Indian sea. S. lat. 10° 30'.

MELINGEN, a town of Switzerland, on the Rufs; 43 miles N.E. of Berne. N. lat. 47° 10'. E. long. 8° 15'.

MELINUM, in *Natural History*, the name of an earth, famous in the earliest ages of painting, being the only white of the great painters of antiquity; and, according to Pliny's account, one of the colours with which alone they performed all their works.

It is a fine white marly earth, of a very compact texture, yet remarkably light; a sort of texture which must render any earth fit for the painter's use, that is of a proper colour. It is frequently found forming a stratum in the earth, lying immediately under the vegetable mould. It is of a very smooth, but not glossy surface; is very soft to the touch, adheres firmly to the tongue, is easily broken between the fingers, and stains the skin in handling. It melts readily in the mouth, and is perfectly fine, leaving not the least grittiness between the teeth. Thrown into water, it makes a great bubbling and loud hissing noise, and moulders away into a fine powder. It does not ferment with acids, and suffers no change in the fire. These are the characters by which the melinum of the ancients is distinguished from all the other white earths. It is still found in the same place from whence the painters of old had it, which is that from whence it has its name, the island of Milo, called Melos by the Greeks, and is common in most of the adjacent islands. It has been of late tried here as a paint, and is found not to make so bright a white as the other substances now in use among the painters, but seems not liable, like them, to turn yellow; and if so, would be worth the consideration of persons in the colour-trade, especially as it may be had in any quantities for carriage.

MELINUS COLOR, *Μελινον χρωμα*, in *Antiquity*, a colour often mentioned in speaking of the habits of players. It was a reddish-yellow, of the colour of ripe apples, in Greek called *μηλα*, and their colour *μηλοειδες χρωμα*.

MELIPILLA, in *Geography*, a town of South America, and capital of a jurisdiction in the kingdom of Chili; 42 miles S.E. of Valparaiso. S. lat. 33° 28'. W. long. 70° 7'.

MELIPU, a river of Ceylon, which runs into the sea near Matara.

MELIS, a town of Germany, in the principality of Gotha; 16 miles S. of Gotha.

MELISANA, a town of Italy, in the country of Friuli; 6 miles S. of Palma Nuova.

MELISEY, a town of France, in the department of the Upper Saone, and chief place of a canton, in the district of Lure. The place contains 1499, and the canton 10,130 inhabitants, on a territory of 187½ kilometres, in 12 communes.

MELISMATICO STYLE. See STYLE.

MELISSA, in *Botany*, from *μηλισσα*, the Greek name of a bee; or rather, as that name itself, like the ancient proper names *Melissa* and *Melissus*, also originated from *μηλι*, *honey*, because of the abundant and excellent honey of the flowers of this herb, for which bees are said greatly to frequent them.—Balm.—Linn. Gen. 298. Schreb. 394. Willd. Sp. Pl. v. 3. 146. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 416. Juss. 115. Tourn. t. 92. Lamarck Dict. v. 4. 76. Illustr. t. 512. (Horminum; Linn. Gen. 299. Juss. 116. Lamarck Dict. v. 3. 136. Illustr. t. 515.)—Class and order, *Didymia Gynnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, nearly bell-shaped, rather dry and scariose, somewhat gaping, angular, striated, permanent, its mouth two-lipped; upper lip three-toothed, bent backwards, flat; lower shorter, sharpish, deeply cloven. Cor. of one petal, ringent; tube cylindrical; mouth gaping; upper lip shortest, erect, vaulted, roundish, cloven; lower three-cleft, the middle segment largest and heart-shaped. Stam. Filaments four, awl-shaped, two of them the length of the corolla, two but half so long; anthers small, cohering in pairs. Pisl. Germen four-cleft; style thread-shaped, the length of the corolla, curved with the stamens under the upper lip of the corolla; stigma slender, cloven, reflexed. Peric. none, except the enlarged, but otherwise unaltered calyx. Seeds in the bottom of the calyx, four, ovate.

Ess. Ch. Calyx scariose, flattish on the upper side; its upper lip with three nearly level-pointed teeth. Upper lip of the corolla somewhat vaulted, cloven; middle lobé of the lower lip heart-shaped.

1. *M. officinalis*. Common Garden Balm. Linn. Sp. Pl. 827. Sm. Prod. Fl. Græc. Sibth. v. 1. 423. Stokes Mat. Med. v. 2. 365. Woodv. Med. Bot. t. 147. (Melissa; Ger. em. 689. Apiastrum five Melissa; Matth. Valgr. v. 2. 181.)—Whorls halved. Bractæas oblong, stalked. Leaves ovate, acute, serrated.—Native of the mountains of Geneva, Savoy, and Italy. Dr. Sibthorp found it in shady woods upon Mount Parnassus, where it is still called *μηλισσόχορτον*, or Balm-plant, which confirms the general opinion of its being the *μηλισσοφυλλον* of Dioscorides, who mentions the lemon-like scent for which this herb is so remarkable, and on account of which it is so generally used to make a grateful cooling infusion for persons in fevers. In this scent it much agrees with the more powerful *Verbena triphylla*, brought from Peru by the unfortunate DOMBEY, see his life in its proper place. The root of this *Melissa* is fibrous and perennial. Stems several, two or three feet high, leafy, somewhat branched, acutely quadrangular, hairy and harsh to the touch. Leaves opposite, stalked, ovate, or very slightly heart-shaped, serrated, somewhat hairy, strongly veined, an inch and half long. Flowers axillary, in halved whorls, leaning toward one side; their stalks downy, accompanied by small, oval, generally sessile bractæas. Calyx hairy. Corolla twice as long, white or pale-purplish.

2. *M. altissima*. Tall Greek Balm. Sibth. in Prodr. Fl. Græc. v. 1. 423.—Whorls halved, stalked. Bractæas stalked.

stalked. Leaves heart-shaped, sharply crenate.—Common in shady situations in Greece, especially under hedges, as well as in Crete. *Sibthorp*. This was suspected by Dr. Sibthorp to be the third *καλαμίνθη* of Dioscorides, but that point is scarcely to be settled with any probability. Neither are we fully satisfied of our present plant being specifically distinct from the first. By the specimens and figure, which last is destined for *t. 579* of the *Flora Græca*, it appears to be a taller and larger herb, with rather more heart-shaped leaves, and the whorls as well as bractæes are elevated on more evident stalks. The flower is represented white, with a pale pink upper lip; the lower lip hairy on the upper side near its base, its middle lobe broadest, but by no means heart-shaped.

3. *M. grandiflora*. Great-flowered Balm. Linn. Sp. Pl. 827. Curt. Mag. t. 208. (Calamentha flore magno; Riv. Monop. Irr. t. 46. f. 1. C. montana præstantior; Germ. 687.)—Flower-stalks axillary, forked, longer than the footstalks. Bractæes lanceolate, sessile. Leaves ovate, serrated.—Native of hilly ground in Greece, Italy, and Germany. Gerard cultivated this species here in 1566, and it may still be frequently seen in gardens, being, as Curtius observes, suitable for the decoration of rock-work. It thrives best in dry gravelly ground, and is perennial, flowering throughout the summer. Root fibrous. Stems about a foot high, weak and spreading. Leaves ovate, hairy. Flowers from three to seven on each long axillary stalk, with several small sessile bractæes. Corolla large, light crimson, with a white streak, and spots on the lower lip. The whole plant has a much more powerful scent than *M. officinalis*, without any of the lemon flavour.

4. *M. pyrenaica*. Pyrenean Balm. Jacq Hort. Vind. v. 2. 86. t. 183. (*M. pyrenaica*, caule brevî, plantaginis folio; Tourn. Inst. 193. Magn. Hort. 133. t. 17. Horminum pyrenaicum; Linn. Sp. Pl. 831.)—Stem leafless. Flowers whorled, turned to one side. Leaves oblong, bluntly toothed.—Native of the highest mountains among the Pyrenees, in the Tyrol and Carniola. We have seen it in no garden, but Jacquin cultivated this plant at Vienna. He was led by Scopoli to refer it to *Melissa*, instead of making it a distinct genus, as Linnæus had done. The root is long, woody, black, and perennial, flowering about the third year from the sowing of the seed, in June. Leaves several, all radical, oblong or somewhat ovate, veiny, smooth, strongly and bluntly toothed, decurrent at the base, on long stalks. Flower-stalks solitary, about a foot high, bearing several pairs of opposite, ovate, entire bractæes, and in the upper part numerous bracteated whorls of simply-stalked flowers leaning to one side. The Corolla is dark blue, about an inch long, handsome, more bell-shaped than in the foregoing, with shorter lips in rounded segments.

Such are all the genuine *Melissæ* known to us. The *M. Calamintha*, *Nepeta*, *cretica* and *fruticosa* of Linnæus appear to us by their habit, as well as by the hairs which close the mouth of the calyx, to belong to *Thymus*, to which genus the two first are referred in the *Flora Britanica*. It happened however that Willdenow did not receive this last-mentioned work, till he had written his *Sp. Pl.* as far as *Tetradynamia*, and as the *Hort. Kew.* generally follows him, these species continue there as they were. Indeed the subject is not without difficulty, as *M. officinalis* has some distant hairs in the mouth of the calyx; but its reflexed upper lip, with three teeth of equal height, is unlike that of the four species above named, though, we confess, too similar in that respect to some kinds of *Thymus*. The middle segment of the lower lip of the corolla, supposed to be

heart-shaped in *Melissa* and entire in *Thymus*, we find as little to be depended on as any of the above marks.

MELISSA, in *Gardening*, comprehends plants of the hardy herbaceous, fibrous-rooted perennial kind, of which the species cultivated are, the officinal, or common garden balm or balm (*M. officinalis*); the great-flowered balm (*M. grandiflora*); the Cretan balm (*M. cretica*); and the shrubby balm (*M. fruticosa*): as to these two last supposed species, see the last article.

The first sort varies occasionally with variegated leaves, and with the stalks slender, the leaves much shorter, the whole plant hairy, and of a strong disagreeable odour, the flowers in whorls, sitting pretty close to the branches, and smaller than those of the common sort; and has the name of Roman balm.

In the second species there are varieties with white flowers, with red flowers, and with variegated leaves; but they are all inferior to the purple

Method of Culture.—The two first sorts may be readily increased by parting the roots, and planting them out in the early autumn, as October, time enough for the offsets to be established before the winter frosts come on. They should be divided into small pieces, with three or four buds to each, and the first sort planted two feet a-part, in beds of common garden earth, and the second sort in the borders or other parts singly, in larger offset slips. The only culture they afterwards require is to keep them clean from weeds, and to cut off the decayed stalks annually in autumn, digging or stirring the ground between the plants in the common kind very well.

The third species may be raised by sowing the seeds in the autumn or spring, but where the seeds are permitted to scatter, there will be a sufficient supply of young plants without any further trouble.

And the fourth species may also be increased by seeds sown in the spring on beds or in pots, or by cuttings planted in the same manner, in any of the summer months, and shaded from the sun. They frequently live through the winter in warm borders; but it is always proper to keep a plant or two in pots, sheltered under a frame during that season, to prevent accidents.

In respect to the first sort, it is useful for various domestic purposes, and the others ornamental, in the borders, clumps, and other parts, as well as affording variety among potted plants in many cases.

MELISSA Officinalis, *Common Balm*, in the *Materia Medica*. The herb, in its recent state, has a weak, roughish, aromatic taste, and a pleasant smell, somewhat of the lemon kind: and hence this species has been denominated "*Melissa odore citri*." On distilling the fresh herb with water, it impregnates the first runnings pretty strongly with its grateful flavour: and when large quantities are employed in this way, there separates and rises to the surface of the aqueous fluid a small portion of essential oil, in colour yellowish, and of a very fragrant smell. Balm was formerly esteemed of great use, in all complaints supposed to proceed from a disordered state of the nervous system, and it was very generally recommended in melancholic and hypochondriacal affections, so that, in the opinion of Paracelsus, the "*primum ens Melissæ*" promised a complete renovation of man. Hoffmann and Boerhaave inclined to the opinion of the Arab physicians, and deemed it an efficacious remedy. S. Paulli and others speak of its effects as an emmenagogue: but neither this nor any other medicinal power is now attributed to balm. As tea, however, it makes a grateful diluent drink in fevers, and in this way it is commonly used, either by itself or acidulated with lemons. The essential oil probably possesses no qualities dif-

ferent from many other aromatics and cordials. Lewis and Woodville.

MELISSA, in *Geography*, a town of Naples, in Calabria Citra; 4 miles N. of Strongoli.

MELISSOPHYLLUM, in *Botany*. See MELITIS.

MELISSUS, in *Biography*, a philosopher of Samos, of the Eleatic sect, who flourished about the eighty-fourth Olympiad, or the year 440 B.C. He was a disciple of Parmenides, to whose doctrines he closely adhered. As a public man, he was conversant with affairs of the state, and acquired great influence among his countrymen, who had a high veneration for his talents and virtues. Being appointed by them to the command of a fleet, he obtained a great naval victory over the Athenians. As a philosopher, he maintained that the principle of all things is one and immutable, or that whatever exists is one being; that this one being includes all things, and is infinite, without beginning or end; that there is neither vacuum nor motion in the universe, nor any such thing as production or decay, that the changes which it seems to suffer, are only illusions of our senses, and mere appearances; and that we ought not to lay down any thing positively concerning the gods, since our knowledge of them is so uncertain. Themistocles is said to have been of the number of his pupils. Enfield's Hist. Phil.

MELISTAURUM, in *Botany*, so called by Forster, from μέλι, honey, and σταυρός, a stake, or a row of sharp pales, the nectary bearing a resemblance to a circular fence of that kind. This author declares the genus to belong to *Polygamia Dioecia*, and professes to describe a male flower only, having never seen the hermaphrodite ones. How he ascertained the existence of such, without having seen them, in a plant known to himself alone, does not appear. In his *Prodrômus*, p. 93, this is ranged among the obscure plants, of which he had seen imperfect specimens only, by the name of *Melistaurum distichum*, and said to be a native of New Caledonia. The male flower is figured in his *Genera*, t. 72, and thus described.

“*Cal.* none, unless the corolla be taken for such. *Cor.* minute, in five deep, roundish, concave, spreading segments. Nectary bell-shaped, abrupt, inserted into the corolla, bearing the stamens on its margin. *Stam.* Filaments twenty, inserted into the edge of the nectary, alternately awl-shaped, with roundish anthers, and of a thicker shape, hairy at the top, without anthers. *Pist.* Germen thickish, in the centre of the flower; style cylindrical, short; stigma blunt. *Peric.* and *Seeds* unknown, as well as the hermaphrodite flowers.”
Forster.

Every reader must perceive this to be the description of an hermaphrodite flower; so that we apprehend some misapplication of terms. However this may be, the description and figure are sufficient to justify Jussieu, who in his *Genera*, p. 438, refers Forster's plant to his own *Anavinga*, Lamarck Illustr. t. 355, which is *Casearia*, Schreb. Gen. 298, nearly allied to the *Samyda* of Linnaeus. See ANAVINGA and CASEARIA.

MELITA, in *Ancient Geography*, an island in the Mediterranean, concerning which geographers have entertained different opinions. Ptolemy places it very near to Africa. Silius Italicus gives it the epithet of “Lanigera” on account of its wool. Cicero speaks of a temple of Juno, which was in this island, situated near a town of the same name. As it was upon an island of this name that St. Paul was shipwrecked, in his voyage to Rome, after his appeal to Cæsar (see Acts, chap. xxvii. and xxviii.), the situation of this island has been the subject of curious and diligent investigation. But no person has employed more labour and

more learning in the research than Mr. Bryant. In the history, we find, that having been tossed for some time in the Adria, they were at last cast upon the island called Melite. The only question is, which is the sea, called Adria or Adriatic; and what island can be found in that sea under this name. The Adriatic sea is that large gulf which lies between Italy and the ancient Illyria, and retains its name to this day. And as to the island we are seeking, there was one in that sea called “Melite,” which is mentioned under that name by the best geographical writers. It appears from ancient authorities, that Melita was an Illyrian island in the Adriatic sea; and that it lay between Cocyra Nigra and the main land, very near the river Naro and the isthmus above it. It was called by the ancients Melite, Melitene, and Melitassa; at this day it is denominated Meleda, and by the Sclavonians, Mlekt, and is in the jurisdiction of Ragusa. Nevertheless it has been the common opinion, that the Melita, now called Malta, was the true place of the apostle's shipwreck; and the natives have a tradition of long standing to support this notion. Mr. Bryant, however, undertakes to prove, that this could not be the island mentioned by the writer of the book of Acts. But in doing this he contends with a host of learning and criticism; Grotius, Cluver, Beza, Bochart, and Bentley. In order to support this opinion, it is necessary for them to prove that Malta is an Adriatic island. This Bochart has much laboured to do; depending upon the authority of the poets, and a few of the later historians, who have extended the Adriatic to the coast of Africa. Polybius, Diodorus, Strabo, and Pliny, give a very different account of this matter. Mr. Bryant, after having fairly and fully stated the arguments of Bochart in favour of Malta, in his own words, undertakes to produce incontestible proof that Malta was not the place mentioned by the sacred historian, and that Melita Illyrica was. It must be allowed that, by the aid of the most approved geographers and historians, he has produced very strong, and to us satisfactory evidence, that the Adriatic sea was comprehended within the great Illyrian gulf, and never reached farther. Strabo expressly determines its extent by two fixed boundaries, that cannot be mistaken; it was included between Italy and the opposite continent. “Where then,” says our author, “was St. Paul shipwrecked? Certainly between Italy and Illyria, that is, the opposite continent. Is Malta to be found in this situation? It is far off, in a sea that has no affinity, no connection with those coasts. But the other Melita, taken notice of by Scylax, Agathemerus, and Pliny, is situated in the Adria, agreeable to the apostle's account; therefore, Melita Illyrica is certainly the island there mentioned.” Mr. Bryant strengthens his other arguments by adverting to the character of the natives, who are described as Βαρβαροι, barbarians. This character could not consistently be applied to the inhabitants of Melita Africana (Malta), which was first colonized by Phœnicians, and afterwards inhabited successively by Carthaginians, Greeks, and Romans. “Who will be so hardy as to denominate any of these nations barbarous? They were each of them renowned for arts, of great power and wealth, and of particular elegance and refinement. As the ancestry was good, the posterity did not fall off. The testimony of Diodorus Siculus (Hist. Bibl. l. v.) will sufficiently vindicate them from the charge of being barbarous. We have an account of some remains of antiquity in this island that will serve to guide our judgment concerning this people. The temples of Juno and Hercules appear to have been very magnificent, and of great extent: and the coins that were originally struck there are said to be of no ordinary cast. Nor can it be said

that those even of the lower class were rude and savage; because from them St. Paul experienced nothing but civility. But if we take a view of Melita Illyrica, the scene will be changed, and the appellation will be found to be more applicable. The character of the Illyrians, near whom this island was situated, is represented as barbarous beyond measure. Modern travellers report of Malta that it harbours no serpents; a blessing, we are told, bequeathed to the island by St. Paul at his departure. If this be true of Malta, what is allowed as a tell of the apostle's having been upon the island, is a proof to me, says our author, that he never was there. As there are no serpents now, my conclusion is, that there never were any; and consequently it could not be the place where St. Paul exhibited the miracle. For other particulars we must refer to Mr. Bryant himself. Bryant's *Observations and Inquiries*, &c. 1767, 4to.

MELITENE, MELEDNI, a country of Asia, in Armenia Minor, which extended to the right of the Euphrates, and was traversed by the river Meles.—Also, a town of Cappadocia, to the S.E., upon a stream which discharged itself into the river Meles.—Also, a country of Asia, in Cappadocia, occupying the S.E. part of it.

MELITENSIS TERRA, *Earth of Malta*, in the *Materia Medica*, an earth of which there are two very different kinds, the one of the genus of boles, the other of the marles. The latter is that known by medicinal authors under this name; the former is the Malta earth now in use: but both being brought from the same place, are confusedly called by the same name.

The Maltese bole, which is what we use now, is a fine earth, of a close compact texture, very heavy; when dug it is of a very pure white, but it is apt to contract a yellowness in drying, and become of a cream colour. It is of a very smooth and shining surface, scarcely at all stains the skin in handling, adheres strongly to the tongue, and melts into a butter-like substance in the mouth. It makes no effervescence with aquafortis, or any other acid menstruum, and suffers no change of colour in the fire. Hill. For the character of boles, see BOLES. The Maltese marle, which is the terra Melitensis of medicinal authors, is a loose, crumbly, and very light earth, of an unequal and irregular texture, and when exposed to the weather, soon falls into fine soft powder; but when preserved and dried, it becomes a loose light mass, of a dirty white colour, with a greyish cast: it is rough to the touch, adheres firmly to the tongue, is very easily crumbled to powder between the fingers, and stains the hands. Thrown into water it swells, and afterwards moulders away into a fine powder. It ferments very violently with acid menstrooms.

Both kinds are found in great abundance in the island of Malta, and the latter has been much esteemed as a remedy against the bites of venomous animals, but with how much justice we cannot say. The other has supplied its place in the German shops, and is used there as a cordial, a sudorific, and astringent. For the character of marles, see MARLE.

MELITIA, in *Geography*, a town of European Turkey, in Thessaly; 24 miles S. of Larissa.

MELITITES, Μελίτιτες, in *Natural History*, an indurated clay, of a yellowish colour, but in many respects approaching to the nature of the moroethus or French chalk: which, when pulverized, yields with water a milky liquor, of a taste somewhat like honey: whence it takes its name.

It is a smooth substance, of a compact texture and great weight, of a fine, even, glossy surface, smooth and soft to the touch, does not adhere to the tongue, nor stain the fingers; but drawn along a rough surface, leaves a fine slender

white line, and staved into very thin pieces, has some degree of transparency. It does not ferment with acids, and burns to a pure white.

It is found in mines of metals, and seems to partake pretty much of the nature of lead; having a sweetness somewhat like that of the galactite, but much fainter. It only differs from the galactite, in that it is milder to the taste. (See GALACTITE.) The ancients used it in inflammations of the eyes, and to dry ulcers.

They also applied it externally in ulcers, and gave it inwardly as a soporific to people who were to suffer pain, supposing it would make them less sensible of it. It is at present very common in Italy, and probably in many other places, but is not known or regarded.

MELITITES Lapis, a name given by some authors to some of the rounder species of echinite, from their resembling an apple in their shape.

MELITO, in *Biography*, an ancient Christian father, who flourished in the second century, was bishop of Sardis. Some moderns have supposed him the same as the angel of the church of Sardis, to whom the epistle in the book of Revelation was directed, but the most judicious critics have abandoned this idea. He travelled into Palestine for the purpose of ascertaining the number of books of the Old Testament, and he is the first Christian writer who has given us a catalogue of those books, which agrees with that of the Jews, excepting that it does not contain the book of Esther. Melito was in the number of those fathers who wrote in defence of the Christian faith, and addressed an apology to the emperor Marcus Antoninus in behalf of the persecuted Christians, of which a fragment is preserved by Eusebius. In this piece he intreats the emperor to examine the accusations which were preferred against the Christians, and to put an end to their persecutions and sufferings, by revoking the edict that he had published against them. He represented to him, "that so far was the Roman empire from having been injured or weakened by Christianity, that it was the more firmly established since the introduction of that religion into it." He boldly stated that the Christian religion had been persecuted only by wicked emperors, such as Nero and Domitian: and that, therefore, they naturally indulged the hope, that from his known clemency and goodness they should receive the same protection which they had enjoyed under the reign of Adrian. The date of this apology is fixed by Eusebius to 170, but Lardner and some others, from internal evidence, give it the date of 175 or 177. Melito was author of various treatises, the titles of which may be seen in the works of Eusebius, but of these only a few fragments remain. From the title of one of those pieces, "Concerning the Revelation of John," critics have inferred that he esteemed the book of Revelation of canonical authority, and to have been written by the apostle John. We have no account of Melito's death, except what is gathered from a letter of Polycrates to Victor, bishop of Rome, which proves it took place before the election of that pontiff, in the year 192. Lardner. Gen. Biog.

MELITO, in *Geography*, a small town and bishop's see of Naples, in Calabria Ultra, several miles S. of Monte Leone.

MELITOPOL, a town of Russia, in the province of Tauris, situated on a lake about 12 miles from the sea of Azof. N. lat. 46° 12'. E. long. 35° 10'.

MELITTIS, in *Botany*, from μελίτις, which in the attic dialect is the name of a bee; so that this word is, in fact, equivalent to *Melissa*, and was adopted by Linnæus therefore for the *Balsam*.—Linn. Gen. 299. Schreb. 395. Willd. Sp. Pl. v. 3. 157. Mart. Mill. Dict. v. 3. Sm.

Fl. Brit. 643. Ait. Hort. Kew. ed. 2. v. 3. 421. Juss. 116. Lamarck Dict. v. 4. 80. Illustr. t. 513.—Class and order, *Didynamia Gymnosperma*. Nat. Ord. *Verticillata*, Linn. *Labiate*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, round, straight, its mouth two-lipped; *upper lip* longest, acute; *lower* shortest, cloven, acute, its segments gaping. *Cor.* of one petal, ringent; *tube* much narrower than the calyx; mouth not much wider; *upper lip* erect, roundish, undivided; *lower* spreading, three-cleft, obtuse, its middle segment largest, flat, undivided, crenate. *Stam.* Filaments four, awl-shaped, sheltered by the upper lip, the two intermediate ones shorter than the outer ones; anthers cohering in pairs, forming a cross, cloven, obtuse. *Pist.* Germen obtuse, four-cleft, hairy; style thread-shaped, the length and situation of the stamens; stigma cloven, acute. *Peric.* none, except the unchanged calyx. *Seeds* four, in the bottom of the calyx.

Obf. The segments of the calyx differ in number in the different species.

Ess. Ch. Calyx unequal, much wider than the tube of the corolla. Upper lip of the corolla flat; lower three-lobed, crenate. Anthers forming a cross.

1. *M. Melissophyllum*. Reddish Bastard-Balm. Linn. Sp. Pl. 832. Engl. Bot. t. 577. Jacq. Austr. t. 26. (*Melissophyllum*; Rivin. Monop. Irr. t. 21. f. 2. *Melissa* Fuchsii; Camer. Hort. t. 30.)—Calyx three-lobed, nearly smooth.—Native of rather mountainous woods and thickets in Germany, Switzerland, France, Greece, and the south-west extremity of England, flowering in the beginning of summer. The root is fibrous and perennial. *Stems* herbaceous, erect, simple, square, leafy, hairy, about eighteen inches high. *Leaves* opposite, stalked, ovate, serrated, hairy, full two inches long and one broad; paler and rather polished beneath. *Flowers* axillary, about three on each side, mostly turned one way, on simple reddish round stalks. *Calyx* purplish, with hairy ribs, ample, three-lobed; the upper lobe or lip longest, acute, often notched or toothed at each side; lower lip in two vertical, equal, pointed or notched, side-lobes. *Corolla* large and handsome, thrice the length of the calyx, externally flesh-coloured, internally whitish, the lip marked with a divided crimson spot, and a few dots on its principal segment, and more or less of a stain on its two lateral lobes. The whole herb has, when fresh, rather an offensive smell; when dried it acquires the scent of new hay, like woodruff, which is also the case with the next. Some of the old authors mistook this *Melittis*, or the following, for they did not always distinguish the two, for the *μελισσοφυλλον* of Dioscorides; but that is evidently rather our *Melissa officinalis*, and as far as can be concluded from the synonym of *Apiastrum*, the *Melissophyllum* of Pliny. Haller therefore is to blame in citing the Roman author, to support his own preference of this last-mentioned name, to that adopted by Linnæus, for the genus before us.

2. *M. grandiflora*. Purple and White Bastard-Balm. Engl. Bot. t. 636. (*M. Melissophyllum*; Curt. Lond. fasc. 6. t. 39. Mill. Illustr. t. 52. *Melissophyllum*; Rivin. Monop. Irr. t. 21. f. 1. *M. adulterinum*; Fuchs. Hist. 497. fig. 498, verum.)—Calyx in four equal lobes, nearly smooth.—Native of woods in Hungary and Switzerland, as well as in Devonshire and Cornwall, flowering early in the summer. Linnæus, Haller, and their pupils for the most part, have confounded this with the foregoing, from which it differs essentially in the calyx, whose lobes are four, all lateral, none vertical, for the most part entire, though sometimes notched. The corolla is larger than the other species, white, with a pale tinge of yellow or cream colour in its up-

per part, the middle segment of its lower lip purple with a white margin. The general habit form and scent of the two plants agree, but this is rather the most ornamental. Clusius distinguished them in his *Hist. v. 2. 37*, as did after him Johnson in Ger. em. 690. The figure in Fuchsius marked *Melissophyllum verum*, is evidently intended for our present plant, the calyx being very clearly defined; but his account can only belong to the Garden Balm, *Melissa officinalis*, as the lemon scent is particularly noticed. It seems therefore that the cuts of these two very dissimilar plants have been transposed by his printer, a mistake hitherto unnoticed. Hence Fuchsius is very erroneously quoted by Vaillant, Haller, and others, as making this *Melittis* the true *Melissa*, or *μελισσοφυλλον*.

3. *M. japonica*. Japan Bastard-Balm. Thunb. Tr. of Linn. Soc. v. 2. 338. Willd. n. 2. (*M. Melissophyllum*, Thunb. Jap. 248.)—Calyx hairy. Leaves alternate, ovate, obtuse, unequally serrated.—Native, as it is presumed, of Japan, though Thunberg saw only one plant, cultivated in a pot, in the island of Nipon, in his journey towards Jeddo, flowering in May and June. The Japanese called it *Sjurowo*. Stem erect, villous, simple, a span high. Leaves alternate, stalked, ovate, obtuse, unequally and doubly serrated, villous, spreading, a finger's length. Footstalks the length of the nail. Flowers axillary, solitary, each on a hairy stalk, an inch long. Calyx rough with bristles, drooping. Thunb.

The leaves being alternate, is so improbable in this genus, that we cannot but suspect a mistake in that particular, or in the generic characters of the plant. We know nothing of this species but what Thunberg has given above.

MELITTIS, in Gardening, comprehends a plant of the flowery perennial kind, of which the species cultivated is, the ballard balm (*M. melissophyllum*).

In this plant there is much honey secreted, from a gland that encircles the base of the germ; it is of course a favourite plant with bees.

And there is a variety smaller in all respects, with the leaves ovate and heart-shaped, the flowers not so large, and usually of a pale red, but sometimes white, which is a native of Switzerland, and other similar situations.

Method of Culture.—Plants of this sort are capable of being increased by parting the roots and planting them out early in the autumn, where they are to remain; but the roots should not be parted oftener than every third year. When seeds can be procured, they may also be raised by sowing them in the early spring, where they are to remain. The plants succeed best in a loamy soil and eastern aspect, where they can be had.

They are capable of affording ornament in the borders and other parts of pleasure-grounds and gardens.

MELIUS INQUIRENDUM, in Law, a writ which lieth for a second inquiry to be made of what lands and tenements a man died seized, where partiality is suspected upon the writ called *diem clausit extremum*.

A "melius inquirendum" shall be awarded out of B.R. where a coroner is guilty of corrupt practices, directed to special commissioners. 1 Vent. 181.

MELIZZANO, in Geography, a town of Naples, in Lavora; 15 miles E. of Capua.

MELKOVATE, a town of Bulgaria; 52 miles S. of Viddin.

MELKSHAM, a considerable market-town in the hundred of Melksham and county of Wilts, England; is pleasantly situated on the river Avon, at the distance of 23 miles from Bath, and 96 from London. In ancient times it is said to have been a place of considerable note by the

the authors of the *Magna Britannia*, who assert that the Conqueror established a court of royal jurisdiction here. Edward I., according to the same authority, had likewise a forest in this neighbourhood, which was joined to that of Chippenham, and committed to the custody of Matthew Fitz-John, who was governor of the castle of Devizes. But if thus important in early times it seems to have greatly decayed before the age of Leland, as neither he, nor his successor Camden, so much as mention it, though the former was undoubtedly in this part of the county. Of late years, however, it has again risen to some degree of consequence by the influence of trade. For a considerable period Melksham has been celebrated for its manufacture of superfine cloths and cassimere. The buildings of this town are in general constructed of freestone, possessing, individually, an appearance of much neatness, but the streets are irregular and narrow. The church, of which the living is a vicarage in the gift of the dean and chapter of Salisbury, is a spacious edifice, with a handsome tower in the centre. Here are likewise meeting-houses for dissenters of different denominations, particularly Independents and Baptists. Methodists are less numerous than in most other towns of the same extent in England, though they have increased considerably of late years. According to the parliamentary returns of 1801, the number of inhabitants in the whole parish was estimated at 4030 persons, 1864 males, and 2166 females, of whom 1299 were engaged in trade, and 370 in agriculture. The proportion of poor is very great, owing to the manufactories which have again begun to decline, and will probably soon leave the town entirely, as has already taken place with regard to Corsham. Since the introduction of the new process in the cloth manufacture, Melksham has lost the advantages it was formerly supposed to possess in respect of situation on the banks of the Avon. The petty sessions for Melksham and Tinhead division are held here. The market is on every alternate Monday. A branch of the Wilts and Berkshire canal comes close up to the town, and communicates with Bath and Bristol. About two miles west of Melksham is Shaw-hill-house, the seat of R. Heathcote, esq. *Magna Britannia*, Wiltshire. *Britton's Beauties of Wiltshire*.

MELL ISLANDS, a cluster of small islands, near the W. coast of Scotland. N. lat. 58° 15'. W. long. 4° 57'.

MELLABA, a town of Africa, in the country of Barca. N. lat. 31° 5'. E. long. 23° 44'.

MELLARIA, in *Ancient Geography*, *Fuentes Orxuna*, a town of Hispania, in Bætica, at the foot of the mountains, and S.W. of Sifapa; which was a considerable place, and is mentioned in the Itinerary of Antonine.—Also, a town of Hispania, in Bætica (now *Tarifa*), situated towards the south on a strait, famous for its salt-works and for its commerce in salted provisions. According to the Itinerary of Antonine, it was 12 miles towards the W. from *Portus Albus*.

MELLATS, in *Chemistry*, are combinations of an acid called the mellitic with certain bases. See MELLITIC Acid.

MELLE, in *Geography*, a town of France, and principal place of a district in the department of the Two Sevres; 13 miles S.E. of Niort. The place contains 1741, and the canton 7782 inhabitants, on a territory of 165 kilometres, in 13 communes. N. lat. 46° 13'. W. long. 0° 4'.—Also, a town of Westphalia, in the bishopric of Osna-bruck; 11 miles S.E. of Vorden.

MELLEGETTA, MELEGETTA, or *Milleguetta*, in *Botany*, the African name, if we mistake not, of the Grains of Paradise, *Amomum Grana Paradisi* of Linnæus; see AMOMUM, sp. 15. See also GRAIN-Coast, where this word is

spelt *Malaguetta*, and supposed to be of Portuguese origin. It is likewise the Spanish name of the same drug, and, wherever it may have originated, is now in common use amongst the black natives of Sierra Leone. From thence we obtained, many years ago, by the kindness of Dr. Adam Afzelius, specimens of these grains in their native husk or capsule, a thing heretofore unknown among collectors of *Materia Medica* in England. We received also, at the same time, specimens of the plant, which is a genuine *Amomum*, according to Mr. Roscoe's able elucidation of the Linnæan order of *Scitamineæ*, see Tr. of Linn. Soc. v. 8. 351. t. 20. f. 11; and is now growing, in many of the English floras, from seeds brought over by Dr. Afzelius; but we have never heard of its flowering. The new edition of *Art. Hort. Kew.* does not contain this species, but it is admitted into the catalogue of the Cambridge garden by Mr. Donn, we believe with perfect propriety. As no authentic characters or descriptions of this plant have appeared, and its synonyms are altogether confused, even in the best writers, we shall attempt to clear up the whole of its history.

AMOMUM *Grana Paradisi*, Grains of Paradise. (True Melligetia Pepper. *Afzelius*.) Linn. Sp. Pl. 2. Berg. Mat. Med. v. 1. 3. (A. n. 3; Linn. Mat. Med. 2, with an erroneous character. *Grana Paradisi officin*; Dale Pharmac. 277; Bauh. Pin. 413; both with many wrong synonyms. Melligetia; Cord. Hist. 195. Meleguetta; Bauh. Prod. 158. Lobel. Advers. 445.)—Stalk simple. Bractæes numerous, closely imbricated. Leaves crowded, ovato-lanceolate, pointed. Capsule oblong, bluntly triangular, minutely hispid. Seeds roundish.—Native of Guinea, about Sierra Leone, from whence the seeds were brought very soon after the discovery of that country by European navigators. The root is perennial, woody, creeping horizontally. Stems erect, simple, slender, three feet high, leafy, but destitute of flowers. Leaves numerous, crowded, two-ranked, alternate, a span long and an inch broad, lanceolate, or slightly ovate, with a long taper point, entire, smooth, single-ribbed, striated with innumerable oblique veins. Their flavour is slightly aromatic, after having been dried twenty years. Footstalks sheathing, linear, very long, smooth, striated. Flower-stalks radical, solitary, an inch or two in length, ascending, clothed with numerous, close, sheathing bractæes, all abrupt, ribbed, somewhat hairy and fringed; the lower ones very short; the upper gradually much larger. Of the parts of the flower nothing can be made out from our specimens. Capsule an inch and half long, half an inch in diameter, oblong, bluntly triangular, scarcely ovate, beaked, of a dark reddish-brown, ribbed, coriaceous, rough with minute deciduous bristly hairs. When broken it is very powerfully aromatic, even after being kept twenty years, with a peculiar pepper-like flavour, rather too strong to be agreeable. Seeds numerous, enveloped in membranes formed of the dried pulp, roundish or somewhat angular, of a shining golden brown, minutely rough or granulated, extremely aromatic, hot, and acrid.

Of this plant or its capsule we have in vain sought for a figure in any book within our reach. The old authors confounded with it the *Cardamomum majus*, of which a figure may be found in Camerarius's *Epitome* 11. f. 1. Tabern. Kreuterb. 1319. Matth. Valgr. v. 1. 25. Ger. em. 1542, the largest kind. Bauh. Hist. v. 2. 204. This is *Amomum angustifolium* of Sonnerat's *Voyage aux Indes*, v. 2. 242. t. 137, found in marshy ground in Madagascar. The habit of this species is not unlike what we have described; but the capsule, (of which old authors mistake the base for the summit, and therefore compare it to a fig,) is very different, being

being ovate, flattened at one side, striated, but smooth, nearly twice the size of the above. Seeds larger than the former, but otherwise not very unlike in appearance, though totally different in their flavour, which much resembles that of the small East Indian Cardamom, and has none of that vehemently hot acrid taste, for which the Grains of Paradise are remarkable.

Gærtner has mistaken for the Mellegetta Pepper another very different species of *Amomum*, for which genus he perversely retains the name *Zingiber*. This is figured in his t. 12, by the name of *Z. Melegueta*, and is remarkable for the large and copious bractæas, each two inches long, encompassing the capsule. The latter is nearly as long, ovate, with a corrugated beak. Seeds ovate or nearly globular, partly angular, smooth and polished, lead-coloured, livid, or glaucous, with a strong umbilicated scar at their base, surrounded with a whitish rather tumid margin. Professor Afzelius has favoured us with some seeds which answer very well to this description, except in being twice as large as Gærtner represents them. But this is not an unfrequent error with him. Of the capsule, or plant producing these seeds, we have no information.

Another species, nearly akin to this of Gærtner, (and which we should almost have taken for his plant, were it not for the seeds just mentioned, considered as such by our friend Afzelius,) is described in Clusius, (*Exot.* 38. fig. 14.) of which we have one capsule, with seeds. The author describes this as bearing four capsules together at the top of the stalk, encompassed with short bractæas at the base, not long ones as in Gærtner. The capsules are two inches in length, ovate with a long beak, slightly triangular, cartilaginous rather than leathery, striated, smooth, reddish-brown. Seeds ovate inclining to cylindrical, dark brown, exquisitely smooth and shining, with a light brown corrugated and notched margin surrounding the scar. They are but slightly aromatic. Clusius seems to have received from Madagascar the true *Cardamomum majus*, *Amomum angustifolium* of Sonnerat mentioned above, which he rightly distinguishes from the Mellegetta Pepper, and seems to imply that it is also distinct from his fig. 14, of which there can be no doubt.

By the above remarks it appears that the species of this genus are very imperfectly known. We have, besides, specimens of some that are not at all described. It is highly desirable that botanical travellers should pay particular attention to this tribe, the seeds of several of which are important articles of commerce, and not useless in medicine. The botanical history of none of the Cardamoms was properly known to Linnæus, and that of the *Cardamomum medium*, *Zingiber Ensifol* of Gærtner, is still entirely in the dark. By the inflorescence we presume it of Dr. Maton's genus *Elettaria*, Tr. of Linn. Soc. v. 10. 254. S.

MELLI, or LAMLEM, in *Geography*, a country of Africa, bounded on the N. by Cashna, on the E. by Wangara, on the S. by Guinea, from which it is separated by mountains, and on the W. by Gago; 500 miles in length from E. to W., and from 150 to 200 in breadth. N. lat. $11^{\circ} 30'$ to 15° . E. long. $5^{\circ} 30'$ to $14^{\circ} 50'$.

MELLID, a town of Spain, in Galicia; 20 miles E. of Compostella.

MELLIFAVIUM, (from *mel* and *favus*, a honey-comb,) in *Surgery*. See MELICERIS.

MELLITE; *Honig-stein*, Wern.; *Honey-stone*, Jamefon; *Mellite*, Häüy, Broch. Brongn.; *Mellitite*, Kirw.

This mineral, which, by most mineralogists, is classed with the inflammable substances, was mistaken, by Born and other writers, for a crystallized variety of amber, till Werner and

Laumont, and principally Klaproth, determined its true nature, which is totally different from that of any other mineral substance we are acquainted with.

Its colour is honey-yellow, of more or less purity and intensity, passing into wax and sometimes into straw and greyish-yellow.

It is seldom found massive and in detached grains; generally crystallized.

The primitive form of the crystals is an octohedron with common base perfectly square; the inclination of each face of the four-sided pyramid, on its corresponding face in the other pyramid, is, according to Häüy, = $93^{\circ} 22'$. This primitive crystal (*Mellitite primitif*, Häüy, pl. 62. f. 12.) occurs more frequently than the following modifications.

1. The primitive octohedron having all the solid angles of the base replaced by quadrilateral planes, which, when they meet, form a rhomboidal dodecahedron, which is, however, different from the garnet dodecahedron in the measurement of its angles. (*Mellitite dodicaëdre*, Häüy, ib. fig. 14.)

2. The primitive octohedron, with the solid angles of the base as well as those of the summit of the pyramids, each replaced by a quadrilateral plane, the surface of which is sometimes more or less convex or curvilinear. (*Mellitite époincé*, Häüy, ib. fig. 13.)

The crystals, which are small and very small, are generally singly dispersed, sometimes grouped together; their surfaces are smooth and shining, seldom rough, and, as it were, corroded.

Internally it is splendid; lustre intermediate between vitreous and resinous.

Fracture perfectly conchoidal; the fragments are indeminately angular, and pretty sharp-edged.

It is seldom found perfectly transparent; oftener translucent and opaque, and possesses a very distinct double refraction.

It is soft; more so than amber. Brittle. Easily frangible, and yields a yellowish-grey powder. Specific gravity 1.550, Klapr., 1.5858, Häüy, 1.666 Abich. The purer crystals become slightly electric by friction.

Exposed to the flame of a candle, or on a burning coal, it first becomes opaque, and white spotted with black, which soon gives way to a pure white. No smoke, flame, or odour are perceived during this process. Projected on melted nitre no real detonation takes place, but only a slight scintillation; and the earthy part remains mixed with the nitre.

It is entirely soluble in nitric acid without heat, and the fragments remain translucent; in muriatic acid, on the other hand, the fragments become more or less opaque.

Abich and Lampadius have given analyses of mellite, which are completely superseded by those performed by Klaproth, according to which this substance is composed of

Alumine	-	-	16
Mellitic acid	-	-	46
Water of crystallization	-	-	38

100 Kl. Beitr. ii. p. 134.

This analysis has been confirmed by Vauquelin in *Ann. de Ch.* vol. xxxvi. p. 203.

This substance has been hitherto found only at Artern, in Thuringia, on a bed of bituminous wood and brown coal, accompanied by small crystals of native sulphur, which by the inattentive observer might be easily mistaken for the straw-yellow variety of mellite. Langenbogen in the Saal circle has been mentioned as another locality of this mineral, as likewise Switzerland, where it is said to have been found with slaggy asphaltum.

MELLITIC ACID, in *Chemistry*, is a product obtained

tained from the mineral called mellite, or honey-stone. It was discovered by Klaproth in the year 1799 (Beiträge, tom. iii. p. 114.); and the existence of it was shortly afterwards confirmed by the researches of Vauquelin (Annales de Chimie, tom. xxxvi. p. 291.) To procure this acid, it is merely necessary to boil the mellite, reduced to powder, in about seventy times its weight of water. The alumine with which it is combined in its native state, is by this process precipitated, and after filtering the solution, and evaporating it to a sufficient degree, the acid appears in a state of tolerable purity. It may be still contaminated with the presence of a little earthy matter; but, by exposing it to the action of alcohol, this will be detached, and it may then be obtained crystallized under the form of needles, or short prisms. In Vauquelin's analysis, the substance under enquiry was procured by adding the pulverized mellite to a solution of carbonate of potash; carbonic acid being evolved, and the mellitic acid uniting to the alkali. Nitric acid was afterwards presented to take up the alkaline base, and the mellitic acid separated, in the course of a few hours, in short prismatic crystals. Thus crystallized, this acid has a brownish-yellow tinge; its taste is slightly sour, accompanied with bitterness; and it is but sparingly soluble in water. Exposed to heat, it is easily decomposed, and emits a dense smoke which has no odour. With the alkalies, earths, and metallic oxyds, it enters into combination, and forms a class of salts, which, in conformity with the principles of the present chemical nomenclature, are denominated *mellats*. The properties of these, however, have been but very imperfectly examined. Mellat of potash crystallizes in prisms, which apparently differ from those of the acid in being longer. The form of mellat of soda is a cube, or three-sided table. The union of mellitic acid with ammonia yields fine transparent six-sided prisms, which become opaque on exposure to the air. Barytes, strontian, and lime, form insoluble compounds; as also does alumine. Solutions of silver, lead, and mercury afford each a white precipitate; but from iron a yellow compound is deposited. This acid, in many of its properties, bears a very near resemblance to the oxalic; but, in others, it exhibits a sufficient difference to forbid our considering them identical. The products it affords when decomposed by heat, are pretty much like those yielded by the vegetable acids. This species of analysis, however, has been, hitherto, so rude and unsatisfactory, that no very accurate comparison can be grounded upon the evidence which it supplies. The acute researches of M. M. Gay Lussac and Thenard have, in a very eminent degree, removed this defect; and we may shortly hope, aided by the light which their genius has diffused over these subjects, to find vegetable chemistry equally demonstrative and certain in its operations with the most accurate branches of experimental science. See *Recherches Physico-Chimiques par Gay Lussac et Thenard*, tom. ii.

MELLO-MESQUITELA, in *Geography*, a town of Portugal, in the province of Beira; 12 miles W. of Guarda.

MELLOON, or MELONE, a town of the Birman empire, on the W. side of the Ava, rich in temples, but in no other respect distinguished. N. lat. 20° 10'. E. long. 96° 9'.

MELLOOR, a town of Hindoostan, in Madura; 12 miles N.E. of Madura.

MELLOUNOSH, a town of Africa, on the E. coast of Tunis; 20 miles S.E. of Jemme.

MELLYPOUR, a town of Hindoostan, in Bahar; 38 miles W.S.W. of Boglipoor.

MELMOTH, WILLIAM, in *Biography*, an eminent and learned pleader at the bar, and member of Lincoln's Inn, was born in 1666. He became a member of that honourable society, and, in conjunction with Mr. Peere Williams, published Vernon's "Reports," under an order of the court of Chancery. It appears that he had an intention of printing his own Reports, and even advertised them as actually preparing for the press. They have not, however, made their appearance. But the work by which he is best known, and for which he will be very long remembered, is entitled "The Great Importance of a Religious Life." This little tract has gone through many editions; more than 40,000 copies were circulated in the course of twenty years, independently of other large impressions that have been taken off, as well for sale as for charitable purposes: and while this article was writing, several copies of a new edition of this valuable tract came into the hands of the writer, from a friend who has undertaken the office of editor, with the view of circulating it among persons into whose hands it would, without his exertions, scarcely have come: and with the hope, that by omitting certain expressions in controverted theology, "the work might recommend itself to a numerous and additional body of rational disciples of our common master." It is a singular circumstance, that the author of this treatise, so much read and highly applauded, should not have been known till the fact was revealed by his son. It was commonly attributed to the first earl of Egmont, to whom it had been given by Mr. Walpole in his Catalogue. Mr. Melmoth died on the 6th of April 1743, and was buried under the cloister of Lincoln's-Inn chapel. His character has been drawn by his son, the subject of the next article, in the following words: "The author's life was one uniform exemplar of those precepts which, with so generous a zeal, and such an elegant and affecting simplicity of style, he endeavours to recommend to general practice. He possessed by temper every moral virtue; by religion every Christian grace. He had a humanity that melted at every distress; a charity which not only thought no evil, but suspected none. He exercised his profession with a skill and integrity which nothing could equal, but the disinterested motive that animated his labours, or the amiable modesty which accompanied all his virtues. He employed his industry, not to gratify his own desires; no man indulged himself less: not to accumulate useless wealth, no man more disdained so unworthy a pursuit: it was for the decent advancement of his family, for the generous assistance of his friends, for the ready relief of the indigent. How often did he exert his distinguished abilities, yet refused the reward of them, in defence of the widow, the fatherless, and him that had none to help him! In a word, few people have ever passed a more useful, not one a more blameless life; and his whole time was employed in doing good, or in meditating it." See preface to "The Great Importance of a Religious Life, &c." 1812. Also "Memoirs of a late eminent Advocate, &c." By William Melmoth, esq. 1796.

MELMOTH, WILLIAM, son of the above, was born in 1710, and first appeared as a writer about the year 1742, in a volume of "Letters" under the name of Fitzosborne, which have been much admired for the elegance of their language, and their just and liberal remarks on various topics, moral and literary. In 1747 he published "A Translation of the Letters of Pliny," in 2 vols. 8vo., which was regarded as one of the best versions of a Latin author that had appeared in our language. In 1753, he gave a translation of the "Letters of Cicero to several of his Friends, with Remarks," in 3 vols. He had previously

to this, written an answer to Mr. Bryant's attack, in his Treatise on the Truth of the Christian Religion, on his remarks on Trajan's Persecution of the Christians in Bithynia, which made a note to his translation of Pliny's Letters. He was the translator likewise of Cicero's treatises "De Amicitia" and "De Senectute," which were published in 1773 and 1777. These he enriched with remarks, literary and philological, which added much to their value. In the former he refuted lord Shaftsbury, who had imputed it as a defect to Christianity, that it gave no precepts in favour of friendship, and Soame Jenyns, who had represented that very omission as a proof of its divine origin. The concluding work of Mr. Melmoth was a tribute of filial affection, in the Memoirs of his father, of which we have already made use. After a long and respectable life passed in literary pursuits, and the practice of private virtue, Mr. Melmoth died at Bath, March 15, 1799, at the age of 89. He had been twice married; first to the daughter of the celebrated Dr. King, principal of St. Mary's-hall, Oxford, and secondly to Mrs. Ogle. "The author of 'The Pursuits of Literature,' says Mr. Melmoth, "is a happy example of the mild influence of learning on a cultivated mind; I mean that learning which is declared to be the aliment of youth, and the delight and consolation of declining years. Who would not envy this fortunate old man, his most finished translation and comment on Tully's Cato? Or rather, who would not rejoice in the refined and mellowed pleasure of so accomplished a gentleman, and so liberal a scholar?" *Gent. Mag.* Preface to Fitzosborne's Letters, 1805.

MELNERSENS, in *Geography*, a town of Westphalia, in the principality of Luneburg-Zelle; 16 miles S.E. of Zelle.

MELNIK, a town of Bohemia, in the circle of Boleflaw, at the conflux of the rivers Elbe and Moldau; 18 miles N. of Prague. N. lat. 50° 20'. E. long. 14° 40'.

MELO, in *Botany*, from *μηλον*, an apple, the Melon. See CUCUMIS.

MELOCACTUS, so called from *Melo*, a Melon, and *Cañus*, the Torch-thistle, because the whole plant resembles a large green deeply-furrowed melon. See CACTUS.

MELOCHIA, a name adopted by Dillenius from Prosper Alpinus. Sonnini says it is the Arabic appellation of *Corehorus olitorius*, a plant agreeing in many particulars of habit and properties with the genus in question. Linn. Gen. 348. Schreb. 454. Willd. Sp. Pl. v. 3. 600. Mart. Mill. Dict. v. 3. Juss. 274. Cavan. Diff. 318. Lamarek Dict. v. 4. 81. Illustr. t. 571. Gærtn. t. 113.—Class and order, *Monadelphia Pentandria*. Nat. Ord. *Columnifera*, Linn. *Malvaceae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cut half-way down into five, half-ovate, acute, permanent segments, and sometimes accompanied by an external unilateral calyx of three leaves. *Cor.* Petals five, inversely heart-shaped, large and spreading. *Stam.* Filaments five, awl-shaped, united at the base into a little cup embracing the germen; anthers simple. *Pist.* Germen superior, roundish; styles five, awl-shaped, erect, the length of the stamens, permanent; stigmas simple. *Peric.* Capsule roundish, or five-sided, of five cells and five acute valves, with double partitions contrary to the valves. *Seeds* either solitary or in pairs, roundish on one side, angular from compression at the other.

Ess. Ch. Calyx single or double. Petals five, spreading. Filaments awl-shaped. Styles five. Capsule of five cells. Seeds one or two in each cell.

A tropical, and principally West Indian genus of plants, for the most part shrubby, and agreeing with *Sida*, more than with any other of the same natural order, in habit

and appearance. The 14th edition of Syft. Veg. enumerates seven species; Willdenow has fourteen. The leaves in all are stalked, simple, scarcely lobed, unequally crenate or serrated, and of course alternate. *Flowers* various in size, situation, and colour. The following examples may suffice.

M. pyramidata. Linn. Sp. Pl. 943. Jacq. Hort. Vind. v. 1. 11. t. 30. Cavan. Diff. 319. t. 172. f. 1.—Flowers in lateral umbels. Capsule pyramidal, with five sharp-pointed angles. Leaves naked.—Native of Brasil and the Caribbee islands. It has long been known in the stoves of this country, but is kept rather as a curiosity than an ornament. The stem and branches are round, straight and wand-like. Leaves ovate, pointed, serrated, two or three inches long and one broad, smooth, with one rib, and many straight, parallel, oblique veins. Flowers small, purple, four or five together, in lateral hairy umbels.

M. concotenata. Linn. Sp. Pl. 944. Cavan. Diff. 322. t. 175. f. 2. (*Althæa indica*, *foliulis parvis*, &c.; Pluk. Phyt. t. 9. f. 5.)—Spikes terminal, crowded. Capsules globose. Leaves serrated, naked.—Native of both Indies. We have not met with it in any garden. The inflorescence, and very small flowers, distinguish this from the foregoing; and the globular capsules, about the size of peas, encompassed with the long linear segments of the calyx, and disposed in spikes, like beads, are peculiar.

M. odorata. Linn. Suppl. 302. Forst. Prod. 47. Cavan. Diff. 320. t. 173. f. 2.—Leaves ovate, somewhat heart-shaped, doubly serrated, naked. Corymbs axillary, many-flowered, downy, on long stalks.—Gathered by Forster in the islands of Tanna and Amsterdam. A very fine species, with broad ovate leaves, three or four inches long, doubly and coarsely serrated, naked but roughish to the touch. The very abundant large and handsome flowers, which we presume are fragrant, grow on long, corymbose, finely downy, axillary stalks. Calyx downy, globose, with long sharp segments. Petals much longer than the calyx, of what colour we know not.

M. lupulina. Swartz. Ind. Occ. v. 2. 1141.—Clusters compound, crowded, axillary, somewhat umbellate, hairy. Leaves ovate or heart-shaped, doubly serrated, soft and hairy beneath.—Native of Jamaica. Communicated to the younger Linnæus by sir Joseph Banks. The shape of the leaves is not unlike the last, but their under side is clothed with minute hairs, very soft to the touch. The permanent scarious calyx has a tawny hue and somewhat of the aspect of hops. Corolla small, white.

M. corchorifolia. Linn. Sp. Pl. 944. Dill. Elth. t. 176. f. 217.—Flowers in axillary sessile hairy heads. Leaves ovate, obscurely lobed, crenate, smooth.—Native of the East Indies. The leaves are about two inches long, very smooth. Flowers small, pale flesh-coloured, in small axillary heads.

MELODIA, Lat. and Ital., *Melodie*, Fr., *μελωδία*, Gr., from *μελος* and *ωδη*, *continuata sonorum connexio*; *Melody*, Eng.

To describe all the rules and prohibitions in framing melodies, would require a code of laws equal to an art of poetry.

Dr. Pepusch (Treatise on Harmony) gives a very short, but intelligible definition of melody; which, he says, "is the progression of sound proceeding from one note to another successively in a single part."

Rousseau is eloquent on the subject. Melody he defines, "the succession of sounds according to the laws of rhythm and modulation, so as to form musical phrases agreeable to the

the ear; vocal melody is called *chant* by the French, instrumental is called *symphonic*."

The Italians called melody *cantilena*; by the English it is termed air, tune, principal or treble part.

A series of sounds only becomes melody by being in some specific time, or measure, that is, by being arranged in regular proportions of time, called *bars*; which, however divided and subdivided into notes of different value, must be performed isochronally, that is, in equal time, and these bars have their laws likewise, and are governed by accents. See ACCENT and BAR.

Though melody is so necessary in the treble part of a composition, it is not necessary in the bass, at least of the same kind. A polyphonic composition is admired by masters when all the parts *sing*, that is, when each part has a series of notes that may be called melody; unless in fugues and imitations, it is not necessary that the inferior part should move in the same kind of notes as the principal. For as only thirds and sixths can move together in a regular ascent or descent in the same kind of notes diatonically, they soon tire, and manifest a want of resources in the composer. And though melody is admired and expected in the several parts, it is best when of a different character from the principal part.

It is in the following periods that the eloquence, feeling, refined taste, and enlarged views of Rousseau appear in this article.

"Melody," he says, "is founded on two different principles: considered in the relations which the sounds of a key bear to each other, it has its principle in harmony, as it is an harmonical analysis, which gives the degrees of the gamut, the chords of the key, and the laws of modulation, the only elements of melody. Upon this principle all the force of melody is confined to the flattering the ear with agreeable sounds, as the eye is flattered by an agreeable change of colours, without their representing by their mixture any particular object or design. But considered as an art of imitation, by which we can awaken different images in the mind, move the heart with different sentiments, excite and calm the passions, operate, in short, moral effects beyond the immediate empire of the senses, we must seek another principle; for no such effects as these can be derived from harmony.

"What then is the second principle? It is in nature as well as the first; but it can only be discovered by more subtle and penetrating observation, to which nature only gives birth, and which cannot be taught. It is instinctive, and often unknown to the possessor. This principle is the same as that which varies the tone of voice in speech, according to what we say, and what we feel in saying it. It is the accent of languages which determines the melody of every country; it is the accent which speaks in singing; and we speak with more or less energy, as the language has more or less accent. The language in which the accent is most marked, produces a melody the most lively and impassioned; and that which has little or no accent, can only suggest a languid and cold melody, without character and without expression. These are the true principles. When we quit them, and speak of the power of music over the human heart, we know not what we talk about. If music only paints by the power of melody, and derives from melody all its force, it follows that all music which does not *sing*, however harmonious it may be, is not an imitative music; for as it can neither move the affections nor paint with its fine chords, it soon tires the ear and leaves the heart cold. It follows, then, that in spite of the multiplicity of parts which harmony can furnish, and which is so often

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abused, as soon as two melodies are heard at once, they mutually enfeeble and efface each other, however excellent they may be in themselves."

This is the language which the Chinese, and every people not accustomed to harmony, talk. See CHINESE Music.

Rousseau is a champion for melody, and M. Laborde for harmony; but we think now, as we did forty years ago, that melody and harmony are as imperfect when separate, as an animal formed by nature with two legs or two arms, is with one. In music, melody and harmony have each distinct and peculiar beauties; but after being heard together, nothing can compensate for their separation. Melody should be polished, and harmony purified; but it was one of the paradoxes of the ingenious Jean-Jacques, in asserting "that harmony was an imperfection, a Gothic and barbarous invention; only wanted by the gross and obtuse organs of northern regions."

Rhythm is as necessary to melody, as that the sounds should follow each other in a manner agreeable to the ear. Sounds of the same length can form no interesting melody; they must be broken into notes of different duration, must be phrased, and have some sense given them, as well as words in literature and grammar.

MELODIEUX, *Fr.* Melodious. This epithet is seldom applied with accuracy. A sweet-toned voice in speech or song may be called *melodious*; but to say that an air or tune, or a piece of music is melodious, is a pleonasm that borders on vulgarity: as these words themselves imply melody; therefore to say that an air or tune is melodious, is saying that melody is melodious.

MELODINUS, in *Botany*, is one of Forster's genera, derived from *μελον*, an *apple*, and *δινω*, to *entwine*, because the plant bears globular fruit resembling apples, and its stem is twisted or scandent.—Forst. Nov. Gen. 19. Linn. Suppl. 23. Schreb. 165. Willd. Sp. Pl. v. 1. 1274. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 74. Juss. 148. Lamarck Illustr. t. 179.—Class and order, *Pentstemonia Digynia*. Nat. Ord. *Contortæ*, Linn. *Spiceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, permanent, of one leaf, cloven into five, ovate segments, folding over each other at the margin. *Cor.* of one petal, valver-shaped; tube cylindrical, thrice as long as the calyx; limb flat, cloven into five, sickle-shaped, crenulated segments, twisted to the right, shorter than the tube. Nectary in the mouth of the tube, stellated, composed of five, cloven, lacerated segments. *Stam.* Filaments five, awl-shaped, very short, in the middle of the tube; anthers ovate. *Pist.* Germen superior, globose; style round, the length of the calyx, divisible into two parts; stigma conical, acute. *Peric.* Berry fleshy, globose, with a fleshy partition. *Seeds* numerous, ovate, or roundish, rather compressed, imbedded in pulp.

Ess. Ch. Corolla contorted, its mouth crowned with five cloven jagged valves. Berry globose, of two cells, with many seeds.

1. *M. scandens*. Climbing Melodinus. Linn. Suppl. 167. Forst. Prod. 20.—Gathered in New Caledonia by Forster, who sent it to Kew Garden in 1775. It is kept in the stove, but does not appear to have flowered. The stem is shrubby, climbing, with round, smooth, leafy branches. Leaves opposite, ovate-oblong, with a blunt point, entire, three or four inches long, thick-edged, smooth and shining, with one rib, and numerous, fine, reticulated veins; paler beneath. Footstalks very short and thick. Stipules none. Flowers terminal, numerous, in a dense downy panicle, with opposite stalks, and small, ovate bractæas. The corolla is externally downy, about half an inch long. Fruit

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the size of a small orange. The habit of this plant, and form of the flowers, are much like *Rauwolfia*, but the numerous seeds afford a sufficient mark of distinction.

MELODORUM, so named by Loureiro, from *mel*, honey, and *odorum*, fragrant, on account of the remarkable sweetness and fragrance of the fruit; as he himself informs us.—Loureir. Cochinch. 351.—Class and order, *Polyandria Polygynia*. Nat. Ord. *Coccoluteae*, Linn. *Anona*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of three short, acute, spreading, permanent leaves. *Cor.* Petals six, triangular, nearly equilateral, fleshy, inflexed and closed, in a double row, concealing the organs of impregnation. *Stam.* Filaments none; anthers numerous, oblong, club-shaped, affixed to a slightly convex receptacle. *Pist.* Germens ten, oblong, pressed together by the surrounding anthers; styles none; stigmas forming a circle, very short. *Peric.* Berries ten, ovate-oblong, rather cylindrical, rough, of one cell, with many seeds. *Seeds* compressed, imbedded in pulp.

Eff. Ch. Calyx of three leaves. Petals six, triangular, equilateral, closed. Berries numerous, oblong, many-seeded.

1. *M. fruticosum*. Cây Bô gie of the Cochinchinese.—Leaves lanceolate, smooth. Stem shrubby.—Native of bushy places in Cochinchina. *Stem* four feet high, erect, with spreading branches. *Leaves* alternate, lanceolate, entire, smooth, fragrant. *Flowers* scattered, solitary, yellowish-brown. *Berries* of the same colour, an inch and a half long, with many seeds, and a very small quantity of highly delicious pulp. A decoction of the leaves is used for removing obstructions.

2. *M. arborcum*. Cây Nhaoc of the same people.—Leaves oblong, downy. Stem arboreous.—Native of woods in Cochinchina. A large tree, with ascending branches. *Leaves* alternate, stalked, ovate-oblong, pointed, entire; downy beneath. *Flowers* scattered, solitary, whitish-green, fleshy, downy, on very short stalks. *Berries* numerous from each flower, not eatable. The timber is used for building.

These plants appear, by the above descriptions, to be very nearly allied to the genus *Uvaria*, to which indeed we should, without much hesitation, refer them. Willdenow has omitted them.

MELO-DRAMA, Lat., a drama written for music. In 1772, when a few persons in France began to perceive that it was possible for operas to be set to better music than that of Lulli and Rameau, an anonymous treatise was published at Paris, under the title of "Traité du Melo-drame, ou Reflexion sur la Musique dramatique," 8vo.

In 1765, a small tract was published by the chevalier de Chastellux, "On the Union of Poetry and Music;" and in 1772, the anonymous "Treatise on Musical Drama." The former had a correspondence with Metastasio on the subject of his book. The poet's answers to his letters are preserved in late editions of his works, and translations inserted in the memoirs of his life and writings published in 1796. In the tract of M. de Chastellux, he gives in his parallel between music and poetry, the *pas* to the former. In the treatise on the melo-drama, the preference is decidedly given to poetry; and music degraded into his menial servant, with no better employment than that of rendering the voice of declamation more audible than that of common speech.

These two writers were the precursors of the Gluckists and Piccininists at Paris. And the dispute is reduced to this simple question; Which, in an opera or musical drama, is to be the tyrant, and which the slave? Metastasio long since with reason and good taste determined in his dramas that no tyranny or slavery should subsist; but that the two filters should mutually assist each other. He gave all the business

of the fable to *recitative*, or musical declamation, and the embellishing sentiment to the *airs* in a recapitulation of the dialogue at the end of each scene.

Though the poetry of Metastasio's operas has always been admired as the best, and almost the only poetry truly lyrical in modern languages; yet it must be allowed that beautiful air, impassioned strains, picturesque music, grateful harmony, fine voices highly cultivated, and great vocal talents, have rendered operas more attractive and captivating than the poetry alone, with all its high polish and beautiful sentiments could have done. Metastasio in his latter days joined in the complaints of French reformers of the Italian operas, against fine music and fine singing. No such jealousy appears in his letters to Farinelli, or to any other correspondent, till he had ceased writing, when musical composition and vocal talents were much more admired and applauded than at present.

MELOE, in *Geography*, a small island in the Baltic; 14 miles E.N.E. of cape Lindesnes.

MELOE, the Blossom-cater, in *Natural History*, a genus of insects of the order Coleoptera; of which the character is antennæ moniliform; thorax roundish; head inflexed and gibbous; shells soft and flexile. This genus is separated into two divisions, *viz.* into those that have wings and those that have none, of which the latter is subdivided. There are, in the several divisions or sections, about 36 species: of these only four are common to our own country, the others are distributed over the globe.

Section A. The insects of this division have no wings, and their shells are abbreviated.

Species.

* **PROSCARABÆUS**. This species is entirely of a blue-black, or dark violet colour. It inhabits Europe, and is described and figured in Mr. Donovan's English Insects. Its trivial name is the "oil-beetle;" thorax narrower than the head; shells very short and oval; abdomen long; the female is thrice as large as the male. It is found very frequently in the spring of the year in our own fields and pastures creeping slowly, the body appearing to be so much distended with eggs as to cause the insect to move with great difficulty. When touched it exudes a yellowish moisture like oil from its pores, whence it derives its name, which was formerly celebrated for its supposed efficacy in the rheumatism, applied to the parts in the form of an embrocation. It has been likewise recommended as a remedy in hydrophobia.

* **VARIEGATUS**. This is of a dull green; thorax edged with red; shells punctured; inhabits Europe; the antennæ are purple; head and thorax dull green, edged with purplish red; the shells are short, very minutely punctured; body large, above variegated with red, green, and copper, beneath and legs purple.

MAJALIS. Dorsal segments of the abdomen red. It inhabits divers parts of Europe, and very much resembles the proscarabæus, and has been thought to be only a variety of it.

MARGINATA. Black; thorax and shells edged with ferruginous; it inhabits Italy; the shells are short, smooth, coriaceous; the abdomen and legs are black.

* **PUNCTATA**. Black; thorax and shells with minute punctures: inhabits England.

* **TECTA**. Blue-black; shells nearly as long as the abdomen; antennæ thicker in the middle: it inhabits Europe, is smaller than the proscarabæus, and differs in the structure of the antennæ, having the shells nearly as long as the abdomen.

Section B. Winged; shells as long as the abdomen; divided into

α. Jaw horny, bifid, containing 26 species, and constituting the tribe *Mylabris* of Fabricius; and

β. Jaw linear, entire; containing four species, which are comprized in the *Georoma* of Fabricius.

Species in subdivision α, Jaw horny, bifid.

FASCIATA. Black; shells with a yellow band in the middle. Is found in India; head black; eyes testaceous; thorax black, with a ferruginous spot on each side; wings hyaline, with ferruginous ribs and veins.

CINOREI. Black; the elytra yellow, marked with three black bands. It is a native of Asia and the eastern parts of Europe. It is used in medicine among the Chinese. The antennæ are sometimes yellow at the tips. Found on the cichorium or fucory, and varies much in the colour of the shells and disposition of the bands.

PURPURA. Black; tip of the shells testaceous, with a black spot; inhabits Barbary and is found among corn.

MARGINALIS. Black; shells with a ferruginous margin; inhabits Barbary, and, like the other, is found among the corn.

ALGERICA. This also is black; shells testaceous, immaculate: it is found in various parts of India.

CAPENSIS. Black; shells with six yellow spots, the first is curved: it inhabits the Cape of Good Hope.

HERMANNIÆ. Villous, black; shells with a yellow spot at the base and two indented yellow bands. It inhabits Guinea; resembles the cichorei, but is not half so large. The antennæ are black, ferruginous at the tip; head and thorax black with a few cinereous hairs.

PUNCTUM. Villous, black; shells with two bands, the first yellow with a black dot, the hinder one reddish. It inhabits Tranquebar.

DECEM-PUNCTATA. Black; shells testaceous, with five black dots: it is found in Italy.

QUADRI-PUNCTATA. Black; shells testaceous, with two black dots: inhabits Russia and resembles the last.

TRI-MACULATA. Black; shells yellow, with a brown band and common dot. It inhabits the East. The shells have a common brown spot in the middle, and a brown band behind which hardly reaches the outer margin.

ARGENTATA. Covered with silvery down; the shells have yellowish spots, most of them connected at the margin. It inhabits Senegal; the antennæ are ferruginous; the shells have a small yellowish spot at the base; three marginal ones and one near the tip all surrounded with a black ring; the tip is yellowish, having a small black dot in the middle; the legs are ferruginous.

AMERICANA. Black; thorax semi-circular; the shells have three yellow bands. It inhabits America. The tip of the antennæ is clavate.

INDICA. This species is black; the shells are yellowish, fulvous behind, with a black dot and three-lobed spot at the base, indented band in the middle and semi-lunar margin at the tip. It is found in India.

ELONGATA. Glossy-black; shells yellow varied with blue.

AUREA. Green-gold; shells fulvous.

ARCUATA. Black, hairy; shells with a curved yellow spot on the fore-part, and two waved yellow bands. Antennæ black, clavate at the tip.

BI-FASCIATA. Black, hairy; shells with a yellow round spot on the fore part and at the outer angle, and two yellow bands. It is found in India. Antennæ yellow; base of the shells piceous. The yellow spot at the angle of the shells is sometimes wanting.

TRIFASCIATA. Steel-blue, with a greenish silky gloss; shells grey, with two greenish-black bands, one of them common. It inhabits near the Caspian sea.

ARATA. Deep glossy black; shells with a yellow waved band towards the tip. It inhabits near the Caspian sea; the antennæ are clavate at the end; the legs secrete a kind of oil.

NYCDALEA. Black; shells red, a little shorter than the abdomen, distinct at the tip. It is found in Russia.

PENNSYLVANICA. This species is entirely black and opaque: it inhabits Pennsylvania in America.

CHIROPTERA. Black, subvillous; shells yellow: it inhabits France. The first joint of the antennæ is three times as large as the rest.

MELANURA. Shells yellow, with four black spots, the tip black; antennæ clavate: it inhabits Calabria.

OCHROPTERA. Black; shells saffron, black at the base, on each side before and behind the middle is a saffron dot, with a black interrupted band and tip.

BICOLOR. Black; shells yellow, with a black dot on each side at the base; the tip and band in the middle, which is broader at the edges, are black.

Species, in subdivision β, Jaw linear and entire.

SCHAEFFERI. Green; antennæ and legs entire. Inhabits Europe. Shanks and tarsi of the male dilated, appendaged.

VAILLI. Green; antennæ and legs black: an inhabitant of Barbary. Abdomen reddish at the base.

SCHREBERI. Green; antennæ, legs, and three segments of the abdomen, yellow.

GOVANI. Black; shells with a sanguineous band and tip.

The larvæ as well as the perfect insects of this genus feed on leaves.

The officinalis cantharis, or Spanish-fly, was till very lately supposed to be a meloe, and indeed is generally so arranged in our pharmacopeias; but more minute and accurate observations have shewn that it is a species of the *LYTTA* genus; which see.

MELOLONTHA, the name of a very peculiar sort of beetle, which is found in all parts of England, and in many other countries among trees and hedges. The French call them *banneton*, and we *cock-chafers*, *dorrs*, and by many other names. The name melolontha is as old as Aristotle, and is given this creature from its feeding on the blossoms of the crab or wild apple. We have, of late years, had great damages done by the grubs of these beetles working under ground; but in Ireland they have been used to come in swarms, in certain years, in the beetle state, and have been so terrible to that country, that the people have called them locusts.

The first time they are remembered by authors to have appeared in this vast abundance, in that country, was in the year 1688. They then appeared in the south-west part of the county of Galway; they appeared first upon the coast, and were brought by a south-west wind, a wind so common there, that it may almost be called the trade wind of Ireland; from the coast they soon spread over the inland parts of the country, and were seen every where in such numbers, as were scarcely to be conceived. They never stirred in the day time, but were seen covering the leaves and branches of trees and hedges, and in many places hanging down in prodigious clusters on one another's backs, in the manner of bees when they swarm. As soon as the sun set, they used to leave the hedges, &c. and take wing, gathering in bodies, and making a humming confused noise like that of drums at a distance. They sometimes formed bodies together, that

darkened the air for three or four miles square. They flew so low sometimes, that it was scarcely possible for a person going along to make his way through them; and by striking against the faces and necks of women and children, they did much mischief, every one leaving a mark behind it; and those of this sex or age, who had been among them, came home all over bruises.

This, however, was little to the mischief they did the fields; for though the middle of the summer was the season in which they came, they had in a few days eaten up all the leaves of the trees so completely, that they all looked as bare as in the depth of winter. The noise they made, while eating in vast numbers together, was like that of sawing timber. The gardens fared no better than the hedges, for they eat up leaves, young stalks, and fruit, and every thing that was green and soft there, and left only a parcel of naked sticks behind them. Many of the trees, thus stripped, wholly perished. Phil. Trans. N^o 234. See SCARABÆUS *Melolontha*.

MELOMELL, a word used by the ancients to express honey impregnated with quinces.

MELON, in *Gardening*, the common name of a well known plant, which is much employed in forcing-frames, &c. See CUCUMIS, and FORCING.

MELON-ground, the space or portion of ground in the kitchen-garden, or other place, which is appropriated to the culture of melons and other vegetables that require artificial heat. See GARDEN, and MELONARY.

MELON-thistle, the common name of a plant of the thistle kind. See CACTUS.

MELON, *Water*, or *Citrus*. See CUCURBITA.

MELONS, *Petrified*, a name given by the people who have written books of travels, &c. to certain stones found on mount Carmel. The monks who inhabit that mountain at this time, and who pretend to be the followers of Elias the prophet, tell a legendary story about these stones, which has given occasion to the name. They say that when Elias lived on that mount, a certain gardener passing by his cave with melons, the prophet asked one of them; but the fellow replying, that they were not melons, but stones that he carried, the prophet miraculously fulfilled the saying, and converted them into stones. Travellers who are fond of these stories were usually glad to pick up one of these sacred stones as they went on; and the monks have been careful enough to gather all they could find for the better opportunity of obliging their visitors; so that though they were once very common, they are now only to be had by the favour of these people.

Breynius is the only author who has given a good account of them; he says, that they are spheric or spheroidal stones, of various sizes, from that of a hen's egg to that of the largest melon, or even more than that. They are generally found bedded in a very hard sand-stone, of a greyish or ash-colour; but they come out whole on breaking the stone, and are of a smooth surface; a greyish colour, or sometimes a brownish ferruginous hue. When they are broken, there is always a cavity found in them, sometimes regular and even, sometimes very irregular, and generally proportioned to the bigness of the stone. This cavity is lined on both sides with minute crystals, which are very bright and pellucid, and have their points standing toward the centre of the cavity. This substance of the stone itself approaches to the nature of marble, of a yellowish colour, and capable of a good polish; when wrought looking very like the Florentine marble. This is a crust of about half an inch or an inch in thickness, according to the bigness of the stone, and sometimes this is covered with a paler-coloured crust, of the thickness of a

straw, which in some degree resembles the bark or rind of the fruit. These stones are truly a sort of concave natural nodules, of the nature of our hollow flints. They have had no fruit for their matrix, nor have ever had any of the ribs and furrows which the melon has, nor any mark of the stalk; and within they have neither the natural divisions of the melon, nor any thing resembling the seeds. It is not only the want of many parts absolutely essential to the fruit supposed to be petrified, which shews that opinion to be erroneous; but the course of nature, in petrifications in general, argues also greatly against it.

The things we meet with, in this state, are all of them such as are naturally hard, dry, and permanent, and none of the tender and succulent bodies, such as the melon, and the like fleshy fruits, which must necessarily rot in the water that conveys the stony matter, before it could at all enter their pores. And the stones are certainly analogous to those concave nodules of a ferruginous colour, in the cavities of which amethysts are produced; and to that genus of stones which Woodward calls concave crystalline balls, common in many parts of the world.

The fallacy of an extravagant opinion in regard to fossils of any particular form, is not peculiar to these stones, as witness the small shells petrified and found in Egypt, which from their flat and roundish shape, are said to be the lentiles, which the children of Israel eat when making the pyramids: the *cornua Ammonis*, which is the remains of a sea-shell, and yet is supposed to be a petrified serpent; the *nummi minerales*, which are the operculums of shell-fish, but are generally supposed by the vulgar, about the places where they are found, to be medals and coins petrified with lying in the earth, and many the like follies. Breyn. de Melon. Petr. Mont. Carm.

MELONARY, in *Gardening*, the portion of ground in the kitchen-garden principally allotted for the business of early and general hot-bed work, in the culture of melons and cucumbers as well as occasionally in other framing culture.

These compartments are mostly inclosed by some sort of fence, and are particularly convenient and useful, as in the practice of hot-bed culture there is unavoidably a considerable littering occasioned at times, by means of the necessary supplies of hot-dung, straw, litter, and other materials, both in the making of the beds and after-culture; which by this means being confined to a particular part, the whole is performed more conveniently, and without incommoding the economy of the other parts of the garden.

They are also very useful when properly chosen in the driest and warmest situations, in the advantage of having the hot-beds on dry ground, and sheltered from cutting winds, with the full benefit of the whole day's sun, as well as in being more secure. In considerable gardens, the places allotted for this use are sometimes of such extent, as to have the hot-houses, or forcing houses, and other appurtenances of that kind, where culture by artificial heat is required, near together, by which time and trouble is saved, and great advantage in other respects gained.

In the choice of a place for this purpose, some part of the warmest, best-sheltered, dry quarter of the garden, which is well defended from the northerly and north-easterly winds, not liable to inundation or the stagnation of water, and conveniently situated for bringing in dung, tan, earth, &c. should be fixed upon. And if, with these advantages, it lies rather a little higher or very gently sloping towards some lower part, it will be more proper, especially when towards the full sun from rising to setting, so as to admit of ranging the

the hot-beds longitudinally east and west, or as nearly in that direction as possible. See GARDEN.

With respect to the extent or dimensions, they must be according to the quantity of hot-bed framing required, as from two or three, to ten, twenty, or thirty frames, or more; and sometimes also for hot-bed ridges for hand-glasses in the same proportions. They may of course be from two or three to five or ten rods square, or to that of a quarter, or half an acre, or more; in which, besides the part immediately allotted for the hot-beds, it is convenient to have room for the previous preparation of the dung, &c. for earthing the hot-beds. And in respect to form the most eligible shape is that of a square, either an equal or an oblong square.

When enclosed, the fences may be six, seven, or eight feet high in the northerly or back part and five or six in front, the sides corresponding, though when extensive they may be nearly of equal height all around. And the internal part, or immediate place for the hot-beds, even when dry, should be a little elevated to throw off the falling wet of heavy rain, &c. and when unavoidably low, or liable to be wet in winter or spring, be raised, with some dry materials, considerably above the general level, that the hot-beds may stand dry, as well as to afford advantage in performing the business of cultivation.

The ground for the immediate place of the hot-beds may generally remain even or level; some, however, form shallow trenches the width and length of the intended hot-beds, as from six to twelve inches deep, and make the lower part of the bed in the trench; which, however, is more proper in a dry or somewhat elevated situation than in low or wet ground, as water is apt to settle in the bottom, and chill the beds, occasioning the heat to decline suddenly.

Besides, by having the hot-beds wholly above ground, there is a better opportunity of applying the occasional linings quite from the bottom upwards. By proper attention in the construction of the different parts of these grounds and in the building of the fences, they may also be rendered highly useful in raising various kinds of fruit, which could not otherwise be the case.

MELONGENA, in *Botany*, a word of Arabian origin, according to Ambrosinus, from whence the Italian *Melanzana* seems to have come, rather than from *Mala insana*, as is commonly supposed; the Egg Plant. This fruit is said to be much used for food among the Arabs. It is also, according to Matthioli, commonly eaten in Italy, being dressed in the form of fritters, with flour and oil, or butter, and seasoned with pepper and salt. That author gives *Melongenæ* as the vulgar Lombard name of the fruit, which he says is called by the Tuscans *Petranciani*. We cannot but suspect the Latin name *Mala insana*, Mad Apples, which this fruit does not appear in any manner to deserve, to have been a corruption of the Arabic or Italian appellation, rather than the reverse. See SOLANUM.

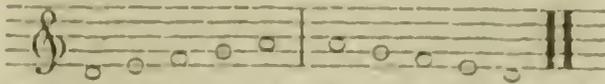
MELOPEPO, from *Melo*, a Melon, and *Pepo*, a Pompon, the name of various round kinds of Gourd. See CUCUMIS.

MELOPŒIA, Gr., *Melopœia*, Fr., a term in the music of the ancients, which implied the selection and arrangement of such sounds as were fit for song. The word is derived from *μελος*, *cantus*, *οικω*, *facio*, *tingo*, *fabrico*, *compono*, "to build the lofty rhyme."

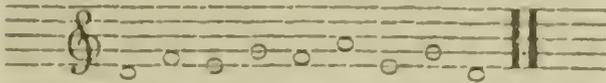
Melopœia had its particular rules, several of which are come down to us, and are still clear and intelligible: such as that an air, or piece of melody, should be composed in some particular genus, and be chiefly confined to the sounds of some certain mode. As to the succession, or order of

these sounds in the course of the air, that was in general confined to four kinds, which Euclid specifies in his Harmonic Introduction. These we shall endeavour to describe with exactness, as they may throw some light upon ancient melody.

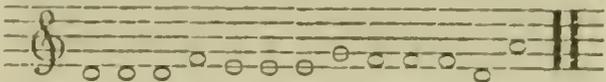
Euclid tells us, first, that sounds may move either ascending or descending regularly; as thus:



which was called *μεγαν*: secondly, by leaps of greater intervals than a second; thus,



which was called *πλοκε*, *interwoven*: thirdly, by repeating the same sound several times, which was called *πρισις*, *iteration*; as in singing these notes,



and fourthly, that sounds may be sustained in the same tone, which we call a *holding note*, and which the Greeks expressed by the word *τοση*.

There were many rules to be observed in moving by leaps, or disjunct degrees, the principal of which was to prefer, in general, consonant to dissonant intervals. It was likewise enjoined not to divide any two semitones into quarter tones, together, or two successive tones into semitones, nor were two major thirds to follow each other.

But these, and a great number of other rules laid down by Aristoxenus, with respect to the succession of intervals, were all derived from the genera, the rules for which were rules for melody. The diatonic genus of the ancients resembled our natural scale in every particular; and it is allowed by Aristoxenus even that three tones may succeed each other, ascending or descending, which is all that is allowed in our diatonic, except in minor keys, where we ascend to the octave of the key note by a sharp seventh, which the ancients seem never to have admitted.

A further detail or explanation of these rules would not make the matter much clearer; however, there are some particulars collected together in the first book of Aristides Quintilianus, that seem to merit attention.

He sets off by dividing Melopœia into three species, taken from the great and general system, which he names after the sounds called *hypate*, *mesè*, and *nete*; that is, lowest, middle, and highest; and these denominations resembled, with respect to melody, our distinctions of base, tenor, and treble.

With regard to modulation in melody, he has the same distinctions as Euclid for the several species, though he differs a little from him in his manner of defining them: but these differences are of small importance to us now; and indeed the authority of Euclid is so superior to that of Aristides Quintilianus, that nothing which can be cited from him would have weight sufficient to invalidate the testimony of so exact and respectable a writer.

However, the moral distinctions of Melopœia to be found in Aristides Quintilianus are so curious and fanciful, that we shall insert a few of them here.

He allows of three modes (*τροποι*) or styles of Melopœia: the *dithyrambic*, or bacchanal; the *nemic*, consecrated to Apollo;

Apollo; and the *tragic*; and acquaints us that the first of these modes employed the strings, or sounds, in the middle of the great system; the second, those at top; and the third, those at the bottom.

These modes had other subaltern modes that were dependent on them; such as the *erotic*, or amorous; the *comic*; and the *encomiastic*, used in panegyrics. All these being thought proper to excite or to calm certain passions, were, by our author, imagined to have had great influence upon the manners (*ἦθη*); and, with respect to this influence, Melopœia was divided into three kinds: first, the *syllabic*, or that which inspired the soft and tender passions, as well as the plaintive, or, as the term implies, such as affect and penetrate the heart; secondly, the *diastatic*, or that which was capable of exhilarating, by kindling joy, or inspiring courage, magnanimity, and sublime sentiments; thirdly, the *hesychastic*, which held the mean between the other two, that is, which could restore the mind to a state of tranquillity and moderation.

The first kind of Melopœia suited poetical subjects of love and gallantry, of complaint and lamentation; the second was reserved for tragic and heroic subjects; the third for hymns, panegyrics, and as a vehicle of exhortation and precept.

All these rules concerning the ancient Melopœia afford only general notions, which, to be rendered clear and intelligible, would require particular discussions, as well as illustrations by example; but the Greek writers on music have absolutely denied us that satisfaction, reserving, perhaps, when they published their works, all such minutiae for the lessons which they gave their scholars in private; for in no one of the seven treatises upon ancient music, collected and published by Meibomius, is a single air or passage of Greek melody come down to us; which is the more extraordinary, as there are few treatises upon modern music, without innumerable examples in notes, to illustrate the precepts they contain.

But whatever were the rules for arranging different sounds in such order as would flatter the ear in the most agreeable manner, it is easy to imagine that this regular disposition, and beautiful order of sounds, constituted nothing more than the mere body of melody, which could only be animated and vivified by the assistance of rhythm or measure. See *Music of the Greeks*.

MELORA, in *Geography*, a small island in the Mediterranean, near the coast of Etruria; 4 miles W. of Leghorn.

MELOS, in *Ancient Geography*, one of the Grecian islands, situated about 24 miles from cape Scyllæum, in the Peloponnesus, south-west of the isle of Siphnos, west of that of Sicinos, and east of the promontory of Malea, in Laconia. It was estimated at about 60 miles in compass, and, according to Pliny, it was almost round. This island, though small, made a very considerable figure in the flourishing ages of Greece. It enjoyed its liberty, says Thucydides, 700 years before the Peloponnesian war. The inhabitants were originally Lacedæmonians, and therefore, in the time of the war just mentioned, refused to join the Athenians, declaring that they would maintain a strict neutrality. They suffered severely for their attachment to Lacedæmon. All who were able to bear arms were put to the sword; the women and children were carried into Attica, and sold for slaves. The island being thus desolated, a new colony was sent thither from Athens. But not long after, Lyfander, the Lacedæmonian general, having obliged the Athenians, in their turn, to surrender at discretion, released the captive Melians, and restored them to their native coun-

try, after having expelled the Athenian colony. Melos afterwards experienced the common fate of the other islands of the Ægean sea, being reduced, with them, to a Roman province. This island abounded with iron mines, and was formerly famous for its wine and honey. The pastures and mineral waters of this island were also commended; and the alum of Melos was in great repute among the Romans, and preferred by them to that of any other country, except the Egyptian. See *MIL*.

MELOS and *Melodias*, which Meibomius has rendered by the Latin words, *modulatio* and *cantilena*, had no other signification than the change of sounds in singing, or, as we should call it, melody; and this is clear from a passage in Bacchius senior, where, in his Introduction to the Art of Music, by question and answer, it is asked, How many kinds of modulation there are? He answers, four; and these, he says, are *rising*, *falling*, *repeating* the same sound to different words, and *remaining upon*, or *holding out*, a musical tone. See *MELOPŒIA*.

MELOSIS, from *μολο*, a probe, in *Surgery*, the examination of a diseased part with a probe.

MELOT, JOHN BAPTIST, in *Biography*, a learned Frenchman, was born at Dijon in 1697, and died at Paris in 1760. He was librarian to the king, and wrote some papers in the "Memoirs of the Academy of Inscriptions," of which he was a member. He was also editor of *Jourville's Life of St. Louis*, with a glossary.

MELOTHRIA, in *Botany*, a name borrowed by Linnæus, in his *Hortus Cliffortianus*, from the *μυλωθρον* of Dioscorides, one of the synonyms of his *αμυλωθρον*, or White Vine, which is supposed to be the *Bryonia*, a plant of the same habit and natural order as the present. Linn. Gen. 24. Schreb. 32. Willd. Sp. Pl. v. 1. 189. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 78. Juss. 395. Lamarck Illustr. t. 28.—Class and order, *Triandria Monogynia*. Nat. Ord. *Cucurbitacea*, Linn. Juss.

Gen. Ch. Cal. Perianth superior, of one leaf, bell-shaped, swelling, five-toothed, deciduous. Cor. of one petal, wheel-shaped; tube the length of the calyx, to which it is on every side united; limb flat, in five deep very blunt segments, dilated outwards. Stam. Filaments three, conical, inserted into the tube of the corolla, and equal to it in length; anthers of two roundish lobes, compressed. Pist. Germen almost entirely inferior, ovate-oblong, pointed; style cylindrical, the length of the stamens; stigmas three, thickish, oblong. Peric. Berry ovate-oblong, internally divided into three parts, without partitions. Seeds several, oblong, compressed.

Obf. Linnæus remarks that he once saw two flowers with stamens only.

Ess. Ch. Calyx bell-shaped, five-cleft. Corolla wheel-shaped, of one petal. Berry of three cells, with many seeds.

1. *M. pendula*. Pendulous Melothria, or American Bryonia. Linn. Sp. Pl. 49. (*Bryonia olivæ fructu rubro*, minor; Plum. Ic. 55. t. 66. f. 2. *Cucumis parva repens virginiana*, fructu minimo; Pink. Phyt. t. 85. f. 5.)—Native of North America and the West Indies. Root annual. Stem slender, branched, climbing by means of simple tendrils. Leaves heart-shaped, five-lobed, obscurely toothed, rough, on thick twisted stalks. Flower-stalks axillary, solitary, simple, capillary, about an inch long. Flowers small, yellow. Fruit red, the size and shape of a small olive. Jussieu says two of the filaments bear each two anthers, which is the case in *Bryonia*, to which genus this plant is certainly very nearly akin. Vahl having omitted the genus in its proper place, had perhaps a design of uniting it to *Bryonia*.

MELOTIS,

MELOTIS, a word used by the surgical writers to express a small probe, properly one intended to be used only to the ear.

MELOZZO, FRANCESCO, in *Biography*, an historical painter, who flourished about 1471. He is celebrated as being one of the first who introduced the fore-shortening of figures upon ceilings, so as to make them appear ascending or descending; and a picture of his, over the great altar in the church of the Apollon at Rome, which represents the ascension of our Saviour, is celebrated with the warmest praises. Vafari says, that the figure of Christ seems to pierce the roof. This work was painted for cardinal Riario, nephew of Nicholas V. about 1472; and when that chapel was repaired, it was cut out and placed in the Quirinal palace, where it is still seen with this epigraphic: "Opus Melotii Forotivensis, qui summo fornices pingendi artem vel prius invenit vel illustravit." Some heads of the apollons were likewise preserved in the Vatican: they are well turned, almost always fore-shortened, and wrought with great finish, diligence, and grace. It is to be lamented that so uncommon a genius has not met with an exact historian, who would have informed us of his preparatory studies. He is best known by the name of Melozzo da Forli.

MELPIGNANO, in *Geography*, a town of Naples, in Otranto; 9 miles W.N.W. of Otranto.

MELPILLY, a town of Hindoollan, in the Carnatic; 25 miles N. of Nellore.

MELPOMENE, the name of one of the nine Muses; who is represented with a mask, to denote her presiding over the stage; and distinguished from Thalia, the comic Muse, by greater dignity in her look, stature, and dress. Melpomene was supposed to preside over all melancholy subjects, as well as tragedy. See Horace, lib. i. od. 24. v. 4. lib. iii. od. 30. v. ult.

MELRICKSTADT, in *Geography*, a town of the duchy of Wurzburg, on the Streys; 19 miles N. of Schweinfurt. N. lat. 50° 27'. E. long. 10° 27'.

MELROSE, a considerable town, and a free borough of barony, situated on the banks of the river Tweed, in the shire of Roxburgh, Scotland. The river divides the town, which extends about a mile in length, into two parts. It is governed by a magistracy, elected annually by the burghesses; and, considering its inland position, may be regarded as a flourishing place. The whole parish, according to the parliamentary returns of 1801, contains 1355 houses, occupied by a population of 6947 inhabitants, viz. 3300 males and 3647 females. Of this number, 668 were reported as being employed in different branches of trade, but principally in the manufacture of linen and coarse woollens.

The parish of Melrose and its immediate neighbourhood are distinguished by numerous and splendid remains of antiquity. The abbey of Melrose is one of the most remarkable monastic structures in Scotland. Its original foundation probably took place towards the close of the sixth century. In the works of the venerable Bede, we have an account of the situation of the more ancient edifice, on the bank of the Tweed, as likewise of its abbots. This place was a celebrated school for learned and religious men, and seems to have continued to flourish till the reign of king David, by whom the new abbey was founded, in the year 1136. The former establishment was at Old Melrose, the name of which still serves to remind the inhabitants that they tread on ground rendered sacred by the piety of their ancestors. The foundation of the wall, which inclosed the ancient monastery and its precincts, can still be discovered, stretching

across a sort of promontory, formed by a curvature of the Tweed; but all vestiges of the buildings are entirely lost. It seems probable, therefore, that they were of little comparative magnitude, and might perhaps have been constructed only of wood, or other portable materials, as most of the churches of that age undoubtedly were. Of a similar description was the edifice erected by king David, which was rebuilt first in the thirteenth century, and again after the accession of Robert Bruce, who granted a revenue for its restoration. This last appears, from its ruins, to have been a truly magnificent and spacious structure. Indeed the size and workmanship of its columns, its symmetrical proportions, and the quality of the stone of which it is constructed, entitle it to rank among the most superb edifices which devotion or superstition has reared in Great Britain. From the charters granted to this monastery by different Scottish monarchs, its inmates appear to have been monks of the Cistercian order, and to have enjoyed a pre-eminence or species of jurisdiction over all their brethren in Scotland. Among the more distinguished of these monks was the celebrated St. Cuthbert, who entered as a monk under Boissil, about the year 601, and had the honour of founding the bishopric of Durham.

The church belonging to this abbey constitutes the most entire part of its ruins. It was built in the form of St. John's cross, and is dedicated to the Virgin Mary. The present extent of this building is 258 feet in length, and 137½ in breadth; its circumference measuring 943. That these are not the original dimensions, however, are evident from the state of the western division, the greater part of which has been destroyed, and that so completely, that it is impossible to determine to what distance it reached. Both the exterior and the interior of this edifice were formerly adorned with a variety of sculptured figures of men and animals. Many of the former, in particular, were destroyed in the reigns of Henry VIII., Edward VI., and Elizabeth, whose statesmen and warriors were no less egregious fanatics than the infuriated Scotch reformer John Knox, in whose time, likewise, this building sustained much additional injury. The niches in which they stood display much curious and beautiful workmanship. The tower, which rose from the middle of the cross or transept, was a noble piece of architecture. Part of it still remains, but the spire is entirely gone. The east window is most magnificent, and consists of four mullions with tracery, variously ornamented. On each side appear several elegant niches, and on the top is the figure of an old man, with a globe in his left hand, resting on his knee; and another of a young man on his right; both in sitting postures, with an open crown over their heads. Underneath this window, in the inside, stood the altar-piece. A great number of piscinas, niches, &c. excellently sculptured, are dispersed throughout the church. Many of the pillars are perfect and beautiful, and the embellishments upon them still seem as if newly executed; a decisive evidence of the excellence both of the stone and of the workmanship. Part of this church continues to be used for divine service.

The ruins yet standing, besides the church, consist chiefly of a part of the walls of the cloisters; the other buildings, of which there were many, being almost entirely levelled with the ground. All of these, together with the gardens, and other conveniences, were enclosed within a lofty wall, which extended about a mile in circuit. A large and elegant chapel formerly occupied the site of the present manse; and to the north of this house there has been lately discovered the foundation of a curious oratory, or private chapel, from
which

which was dug up a large cistern, formed from one stone, having a leaden pipe appended to it, for the conveyance of water.

At some distance to the south of this town are the three Eldon-hills, on the northernmost of which is a large Roman encampment, and below it are the remains of an extensive British fortress. Around this were several smaller forts, also of British origin, some of which the Romans appear to have converted into more defensible posts. Three entrenchments on these hills were connected by a very singular kind of military road, described by Mr. Kinghorn, who surveyed it in 1803, as being in general about 40 feet broad, but in some places 50, where the unevenness of the ground required such a breadth. On each side of this road is a ditch, from 12 to 28 feet wide, whence the earth is thrown up so as to form a mound on the exterior side. As this remains differs materially from all other Roman roads in this country, it seems probable that it has been the work of the Romanized Britons, during their contests with the Picts and Scots, after the departure of their enlightened conquerors, whose modes of warfare they would naturally endeavour to imitate. From the British fort on Eldon-hills to the fortrefs on Caldfheds-hill there likewise runs a fosse and rampart, which seems to have been carried through the distance between these fortresses as a defensible boundary. The great Roman road crosses the Tweed at the village of Galtonside, a little above Melrose. On the declivity of the hill, on which this village stands, are the remains of a spacious encampment. The stone wall around it is still tolerably entire. Half a mile to the east is another entrenchment, called Cheller-Knows, which was probably the most considerable station they possessed in this part of the country, being nearly three-quarters of a mile in circumference. Chalmer's Caledonia, vol. ii. 40. 1810. Beauties of Scotland. vol. ii. Sinclair's Statistical Account of Scotland.

MELSACK, a town of Prussia, in the province of Ermeland; 36 miles S.W. of Königsberg. N. lat. 54° 12'. E. long. 20 7'.

MELSO, a town of Italy, in Friuli; 9 miles N.W. of Udina.

MELT. See **MILT**.

MELTING-CONE, in *Affaying*, is a small vessel made of copper or brass, of a conic figure, and of a nicely polished surface within. Its use is to receive melted metals, and serve for their precipitation, which is effected, when two bodies melted together, and yet not mixing perfectly with one another in the fusion, separate in the cooling into two strata, on account of their different specific gravity. This precipitation might be made in the same vessel in which the fusion is performed; but then the melting-pot or crucible must be broken every time to get it out, whereas the conic shape, and polished surface of this vessel, makes it easily got out without violence. The shape of this vessel is also of another use in the operation; for by means of it, the heavy matter subsiding to a point, is formed into a perfect and separate regulus, even where the whole quantity, as is very frequently the case, has been but very small.

When the quantity of the melted matter is great, it is common to use, instead of this cone, a large brass or iron mortar, or any other conveniently shaped brass or iron vessel. It is necessary, when the cone is of brass, to be cautious that it be not made too hot; for the brittleness of that metal, when hot, makes it easily break, on the striking with any force on that occasion, to make the melted mass fall out.

These, and all other moulds for the receiving melted

metals, must always be well heated before the mass is poured into them, lest they should have contracted a moisture from the air, or have been wetted by accident; in which case the melted metal will be thrown out of them with great violence and danger. They ought also to be smeared over with tallow on their inside, that the regulus may be the more easily taken out of them, and the surface of the mould not corroded by the melted mass poured in.

If a very large quantity of a metal is, however, to be received into them, and especially if any thing sulphureous have place among it, this caution of tallowing the moulds does not prove sufficient; for the large quantity of the mass makes it continue hot so long, that this becomes but a slight defence to the surface of the mould. In this case the assayer has recourse to a lute, reduced to a thin pap with water, which being applied in form of a very thin crust, all over the inside of the cone, or mould, soon dries up, indeed, but always preserves the sides of the vessel from the corrosion of the mass. And this caution is found necessary, even when pure copper is melted alone, without any mixture of sulphur.

MELTING FIRE. See **FIRE**.

MELTING, *Surveyor of*. See **SURVEYOR**.

MELTON-MOWBRAY, in *Geography*, in ancient writings called Medeltune and Meltone, a small market-town, in the hundred of Framland, and county of Leicester, England, is situated in a vale on the banks of the river Eye, 15 miles from Leicester, and 104 from London. Connected with this town are three bridges over the rivers Eye and Seaford. These are repaired, and the streets preserved in good condition, with lamps, &c. from the rents arising out of the town estates. The church, which Leland calls "a faire paroche church, sumtime an hospital and cell to Lewis in Suffex," is a spacious structure, consisting of a nave, aisles, transepts, and chancel, with a tower in the centre, and a porch at the west end. The latter is a peculiar feature to the building, and has an elegant door-way, with an ogee arch. Above this porch is the large western window, comprising five lights, with four lofty mullions. The whole church is crowned with an embattled parapet, and at each angle is a crocketed pinnacle. The tower consists of two well-proportioned stories above the church. The poor of this town derive assistance from several charitable benefactions; among which are some public schools. So early as the reign of Henry III. we find these taken under the immediate patronage of that monarch. A free school for girls was established here in 1795. In the population report of the year 1801, Melton-Mowbray was stated to contain 348 houses and 1766 inhabitants. The market-day is Tuesday; and at every alternate market is generally a large show of cattle. Here are also three annual fairs, and a statute for hiring servants.

Among the more eminent natives of Melton were John de Kirkby, who was appointed keeper of the great seal in 1272, lord high treasurer in 1283, and bishop of Ely in 1286; William de Melton, successively lord high treasurer, lord chancellor, and archbishop of York, in the reigns of Edward II. and III.; John Henley, better known by the popular appellation of Orator Henley, who distinguished himself, about the middle of the last century, by his eccentric lectures. See **HENLEY**.

At Burton-Lazars, a hamlet to Melton, about two miles from the town, an hospital, for leprous brethren of the order of St. Augustine, was founded in the reign of king Stephen, by a general collection throughout England, but chiefly by the assistance of Roger de Mowbray. In adopt-
ing

ing this situation, the founders were probably influenced by a bath or spring, the waters of which were formerly in high estimation for the disorder called Leprosy, and are still said to afford considerable benefit to persons in heretofore complaints. A bathing room and drinking room were built here about the year 1765, for the accommodation of the athleted visitors. Nichols' History of Leicestershire, vol. 1. Beauties of England and Wales, vol. ix., by J. Britton.

MELTZ, a town of Bavaria; 10 miles N. of Bamberg.

MELVILLE, Sir JAMES, in *Biography*, a statesman and historian, was born at Hall-hill, in Fife-shire, in 1531. At the age of fourteen he entered the service of the queen-regent, and was appointed page to her daughter Mary, then wife to the dauphin of France. After passing some time in her service, she permitted him to enter into that of the comtable Montmorency, who sent him over to Scotland in 1559, in order that he might obtain a faithful account of the state of parties in that kingdom. Having remained several years in the employ of that nobleman, he visited the court of the elector palatine, who detained him three years in various negotiations with the German princes. He then passed through Italy and Switzerland, and returned to the elector's court, where he found a summons from Mary, who had now returned to take possession of the crown of her native country. He followed her to Scotland, in 1561, in the character of gentleman of the bed-chamber, and was employed by her confidentially in various important affairs till her imprisonment in Lochleven castle. He had been appointed one of her privy-counsellors, and was sent more than once to the court of Elizabeth. He maintained a correspondence in England in favour of Mary's succession to the crown of that kingdom, but upon the manifestation of her unhappy partiality for Bothwell, after her husband's murder, he ventured upon the strongest remonstrances with her. She not only disregarded these admonitions, but communicated them to Bothwell, in consequence of which the faithful Melvil was obliged, for some time, to absent himself from court. When Mary was detained a prisoner in England, she recommended her faithful servant to her son James VI., who consulted him and made use of his services till he acceded to the throne of England. He was ever the adviser of prudent and moderate measures, and retained the esteem of his royal master, who would willingly have taken him to England as one of his ministers. Melvil, however, thought himself too far advanced in years for so important a change in his habits, and he retired to his family seat, where he died in the year 1606. He left behind him in MS. an historical work, which came into the possession of his grandson, and was published in 1683, by Mr. George Scott, under the title of "Memoirs of Sir James Melvil of Hall-hill, containing an impartial account of the most remarkable affairs of state during the last age, not mentioned by other historians, more particularly relating to the kingdoms of England and Scotland, under the reigns of queen Elizabeth, Mary queen of Scots, and king James. In all which transactions the author was publicly concerned." To this work the reader is referred for more information relating to the author; and also to Robertson's History of Scotland. A brother of Sir James was also in the service of Mary, and is probably the Sir Andrew Melvil who was present at her death.

MELVIN-LOUGH, in *Geography*, a considerable lake of Ireland, between the counties of Fermanagh and Leitrim, from which a small river flows to the bay of Donegal.

MELUING, a town of Norway, in the diocese of Dronheim; 32 miles W.N.W. of Romsdal.

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MELUN, a city of France, and principal place of the department of the Seine and Marne, of which it is the capital, situated on the Seine; before the revolution it contained one college and three parishes, two churches and two abbies. It carries on a trade with Flanders, coal, wool, wine, and cheese. The place contains 6124, and the two cantons, into which it is divided, 18,922 inhabitants, on a territory consisting of 87,400 acres, in 31 columns. N. lat. 48° 32' E. long. 41°.

MELYKUT, a town of Hungary; 16 miles E. of Buda.

MELYRIS, in *Natural History*, a genus of insects of the order Coleoptera; the generic character is, antennae entirely perforate; head inflexed under the thorax; thorax margined; lip clavate, emarginate; jaw one-toothed, pointed. There are three

Species.

VIRIDIS. Green; shells with three raised lines; it inhabits the Cape; antennae black; thorax reflexed at the edge, and grooved on the back, scutellum small and round; shells rough.

NIGER. Black; shells with three raised lines. A specimen of this species of the myelaris is in Sir Joseph Banks' museum. It is only about one-third the size of the last; thorax a little prominent before; the shells rough.

LINPARIS; Green; shell with three raised lines, and one on each side the thorax: it is about half the size of the viridis; thorax grooved, with a raised line on each side; lines on the shells crenate.

MELZEN, or MELZEN, in *Geography*, a town of Saxony, in Thuringia; six miles S. of Weissenfels.

MELZO, a town of Italy; 14 miles N.E. of Milan.

MEMAUN, a town of Persia, in Khorasan; 18 miles E.S.E. of Velazghard.

MEMBERS, in *Anatomy*, the exterior parts, arising from the trunk or body of an animal like the boughs from the trunk of a tree.

In which sense, members, *membra*, amount to much the same with limbs, *artus*: though some make a difference between the two: restraining members more immediately to the fleshy parts which cover the limbs, and artus to the bones and nerves. Physicians divide the body into three regions; the head, the breast, and the lower ventricle; and the extremities, which are the members. See EXTREMITIES.

MEMBER, in *Architecture*, denotes any part of a building; as a frieze, cornice, or the like.

MEMBER is sometimes also used for moulding.

MEMBER, in *Grammar*, is applied to the parts of a period, or sentence.

MEMBER is also used to denote some particular order or rank in a state or government: thus we say, member of a corporation, member of parliament, member of the council, &c.

MEMBERED, or MEMBERTD. in *Heraldry*, is when the beak, or legs, or feet of an eagle, griffin, or other bird, are of a different colour from the rest of the body.

MEMBIG, in *Geography*, a town of Syria, in the pachalic of Aleppo; 30 miles N. of Aleppo.

MEMBRANA, in *Anatomy*. See MEMBRANE.

MEMBRANA *Arachnoidea*, one of the coverings of the brain and medulla spinalis. See BRAIN.

MEMBRANA *Conjunctiva*, the mucous membrane lining the eye-lids; and covering the anterior surface of the eye. See EYE.

MEMBRANA *Decidua*, one of the coverings of the ovum. See EMBRYO.

MEMBRANA *Hyalidea*, the transparent covering of the vitreous humour of the eye. See EYE.

MEMBRANA *Mucosa*, the febraceous substance covering the membrana tympani in the fœtus. See EAR.

MEMBRANA *Nictitans*, a peculiar fold of the conjunctiva, which can be drawn across the front of the eye by means of two peculiar muscles connected with it. (See BIRDS, *Anatomy of*.) In quadrupeds a piece of cartilage is placed in a fold of the same kind, and the eye can be rolled behind it. See MAMMALIA, *Anatomy of*.

MEMBRANA *Pituitaria*, the mucous membrane lining the cavities of the nose. See NOSE.

MEMBRANA *Pupillaris*, an exceedingly thin production filling the aperture of the pupil in the fœtus. See EYE.

MEMBRANA *Ruyfchiana*, the internal surface of the choroid membrane of the eye. See EYE.

MEMBRANA *Tympani*, a membrane terminating the meatus auditorius externus, and forming the boundary between it and the cavity of the tympanum. See EAR.

MEMBRANE is a term applied to several parts of the body, which consist of thin sheets of animal substance, in which the thickness bears a very small proportion to the surface. This disposition is found in several tissues; the term, therefore, denotes a peculiarity of arrangement and form, and not of internal structure, and hence it includes parts differing from each other very widely in organisation, properties, and functions.

Membranes never have an insulated existence: they are disseminated among the other organs of the body, and concur in their formation; hence their history has generally been associated to that of the organs on which they are expanded. This is a convenient arrangement for purposes of description, but it occasions us to lose sight of the analogies between the particular membranes, and to neglect those general considerations, which form a very interesting part of the study of anatomy, which exhibit to us nature every where uniform in her proceedings, varying only in their results, sparing of the means which she employs, profuse in the effects obtained from them, modifying in a thousand ways some general principles, which, differently applied, preside over the animal economy, and are the sources of its innumerable phenomena. Haller has some general remarks on the membranes, but he establishes no demarcations between them. He describes them all as analogous in their texture, and having for their common basis the cellular organ, to which he says that they may all be easily reduced, principally by means of maceration. That this view is incorrect in many points, will appear from the sequel of the present article: how, indeed, can we expect the composition to be the same, when the conformation, the vital properties, and the functions are different?

Bichat is the anatomist to whom we are the most indebted for an elucidation of this subject. His "Traité des Membranes en general, et des diverses Membranes en particulier," Paris, an 8, contains a distribution of these organs into certain classes, a general account of each of these, and a particular description of the individual membrane. "When," says he, "we observe all the membranes in a general view, it seems that their classification must be very complicated, both on account of their great number, and their apparent variety. The extent of the different membranes, compared to that of the skin, cannot be less than in the proportion of eight to one: yet, perhaps, no two of them exactly agree in appearance. An examination of

their structure and functions quickly shews us that several come near to each other, and are distinguished only by their form." Bichat establishes two general divisions, viz. the simple and compound membranes: the latter are composed of two of the former united together, and exhibit a combination of the characters of each. He makes three classes of simple membranes. 1. The mucous, so named from the fluid, which moistens their surface. 2. The serous, characterised also by the particular fluid which covers them, and containing the membranes that line the several circumscribed cavities connected with the different viscera, and the smooth coverings of the joints, bursa mucosæ, &c. 3. The fibrous, moistened by no fluid, and distinguished by the fibres that enter into their composition.

From the union of these proceed the fibro-serous, sero-mucous, and fibro-mucous membranes.

There are moreover some, which either exist insulated, or are little known, and consequently cannot be brought under any classification.

The mucous membranes occupy the interior of the cavities, which communicate with the skin at the various openings of the latter on the surface of the body. Their number appears considerable on the first view of the subject; for the organs which they line are very numerous. The mouth, stomach, intestines, œsophagus, bladder, urethra, uterus, the ureters, all the excretory tubes, &c. &c. derive a part of their texture from these membranes. However, when we consider that they are every where continuous, that they arise by prolongations, one from the other, as we see them originally derived from the skin, their number must be very much reduced. In fact, when we regard them thus in a general view, as expanded over all the organs in which they are continuous, and not as insulated in each particular organ, they are reduced to two general surfaces, which may be named, from the various parts over which they are extended, the gastro-pulmonary, and the genito-urinary. The former is found in the head, neck, and abdomen: the latter in the abdomen, and more particularly in the pelvis.

There is one small insulated mucous surface, viz. that which enters the openings on the nipple, and lines the lactiferous ducts. As the observations on the others are applicable to this, we shall not examine it in detail.

The gastro-pulmonary surface enters the body by the mouth, the nose, and the front of the eye. 1. It lines the two first mentioned cavities, is continued from one of them into the excretory tubes of the parotid and submaxillary glands, and from the other into all the sinuses of the nose; it forms the conjunctiva, enters the puncta lacrymalia, lines the lacrymal sac and nasal duct, from which it is continued into the nose. 2. It descends into the pharynx, and penetrates through the Eustachian tube into the ear. 3. It goes into the larynx and trachea, and is expanded over all the air-tubes and vesicles of the lungs. 4. It lines the œsophagus and stomach. 5. It enters the duodenum, and furnishes two prolongations, one to the ductus choledochus, the hepatic duct and its numerous ramifications, the cystic duct and gall-bladder, the other to the pancreatic duct and its branches. 6. It is then continued into the small and large intestines, and lastly ends at the anus, where it is identified with the skin.

The second general mucous surface enters, in the male subject, at the urethra, and thence is expanded, on one side, over the bladder, ureters, pelvises, and calyces of the kidneys, the papillæ of the same organs and capillary tubes which open on their points; on the other it enters the excretory ducts of the prostate, the seminal ejaculatory tubes, vesiculæ

vesiculæ feminales, vasa deferentia, and the numerous intricate ducts which arise from them. In the female this membrane enters at the colon, extends over the urinary organs as in man, penetrates the vagina, and lines that canal as well as the uterus and the Fallopian tubes, at the apertures of which it is continuous with the peritoneum. This is the only example in the animal economy of a communication between mucous and serous surfaces.

The phrases of membranes entering cavities, being prolonged or extended from one part to another, &c. are not to be understood as indicating the progress of nature in the formation of parts, but merely as descriptive of the relations existing between the organs when fully formed. The membranes belonging to every part are formed independently in it, and not derived from any other.

The distinction of the two great divisions of the mucous system, and the connection of all the parts in each system are manifested, not only by anatomical researches, but also by pathological phenomena. In epidemic catarrhs one of these surfaces is often affected throughout, while the other escapes entirely; the gastro-pulmonary membrane is the seat of the disease in all its divisions, and the genito-urinary is completely unconcerned in the affection.

Irritation of any point often causes pain in some other part of the same surface; thus stone in the bladder produces uneasiness at the front end of the urethra, worms in the intestines cause itching of the nose, &c. But it is very uncommon for partial irritation of one membrane to affect the other: yet there are examples of such an occurrence, as in the bleeding from the lungs, which frequently supplies the place of menstruation, when it is interrupted accidentally.

The two mucous surfaces are united by means of the skin: the latter organ with the former may be regarded as a general and continuous membrane, covering the exterior surface of the body at all points, and prolonged in the interior over most of the important organs. Every mucous membrane has two surfaces; the one adhering to the neighbouring parts, the other free, in many cases villous, and always moistened with a mucous fluid.

The adhering surface corresponds almost universally to muscles, either of the animal or the organic life. The mouth, the pharynx, the whole alimentary canal, the bladder, a part of the urethra, &c. present a muscular stratum embracing the mucous membrane on the outside. This disposition agrees entirely with that of the skin in animals which have a panniculus carnosus: there are indeed many points of resemblance between these organs, which we have already observed to be continuous. It subjects the mucous membranes to habitual motions, which probably favour the secretion of their fluid and its subsequent excretion, as well as the various other functions of these organs. The muscular stratum is inserted into the close and dense tissue, named by Bichat the *tissu foumuqueux*, in which the strength of the organ resides, and which according to him decides and maintains the form of the part.

The free surface of the mucous membranes, habitually moistened by the fluid, from which their name is derived, presents three kinds of folds.

1. The first are composed by the muscular as well as the mucous coat; their situation is defined by a depression on the exterior surface of the organ, and they exist constantly whatever may be its state in respect to contraction or dilatation. The pylorus and valve of the colon are of this kind.

2. Others are formed in the mucous membrane only, are constantly seen, whether the part be full or empty, but are

rather less sensible in the latter state. They arise from the membrane being much more extensive than the surfaces to which it is applied, and being fold'd, compensate this difference. The valvula conniventes of the small intestine exemplify these very well. The cut edges of the muscular and serous coverings, as seen in a longitudinal section of the intestine, form straight lines, while that of the mucous surface is a very wavy line.

3. The last kind may be regarded in a manner as accidental, and is seen only when the organ is contracted; such are those of the stomach and large intestine. The cavity of the former, in particular, presents, in this state, very numerous and large folds, which may be compared, in some measure, so far as their appearance goes, to the cerebral convolutions. Distend it fully, and the surface becomes completely smooth. The exhaustion of the vital forces in individuals who die after lingering and debilitating diseases, occasions their stomachs to be frequently destitute of these folds, although they may be empty. But if the full stomach be cut longitudinally in a living animal, or in one recently killed, the contraction of the muscular coat will speedily produce the folds in a very marked degree. It follows from this circumstance, that the surface of the mucous membranes is nearly as extensive in the contracted as in the dilated state of the organs which they line. But all parts are not alike in this respect; the observation is true of the œsophagus, stomach, and large intestine; but it is not equally applicable to the urinary and gall-bladders.

The free surface of the mucous membrane is every where in contact with bodies heterogeneous to that of the animal; which are either introduced from without for various purposes, as in the alimentary canal and trachea, or derived from within, as in the excretory tubes of glands, all of which open on cavities lined by mucous membranes. Hence these membranes may be regarded as a kind of barriers, placed between our organs and extraneous substances, and protecting them from the noxious impressions of the latter, and serving the same purpose in the interior of the body, which the skin fulfils on the outside with regard to the objects that surround us, and are incessantly acting upon us.

The organisation and vital properties of the mucous system are accommodated to this habitual contact with foreign substances. Solid matters, as metals, stone, wood, &c. introduced into the interior of other parts, inevitably excite inflammation and suppuration by their simple contact; but they traverse the mucous system with impunity, provided their angles or asperities do not tear it; various things for example go through the alimentary canal, and are voided per anum, without having excited an uneasy feeling. Irritating fluids may be swallowed, or injected per anum, although they would produce abscesses, if conveyed into the cellular system.

On the other hand, this system may be exposed with impunity to external agents, where any part of it is protruded either through the natural, or through artificial apertures. This is exemplified in prolapsus of the uterus and rectum, of the intestine through an artificial anus, &c. In these instances the mucous surfaces seem to serve the office of integuments, and surrounding bodies hardly affect them more than they do the skin. The serous system, on the contrary, when exposed, as in the operation of hernia, &c. inevitably inflames. The cellular, muscular, nervous, and glandular tissues exhibit the same phenomenon.

Fistulous openings are every where surrounded by a callous substance, which defends the cellular and muscular tissues traversed by the fistula: an exposed mucous surface exhibits nothing of this kind, because its organisation sufficiently

protects it. The urinary and other fluids never escape through artificial canals excavated in the surrounding organs, without callosities being formed in the course of these canals; on the contrary, they traverse mucous surfaces with impunity. Cut an opening in a limb, and leave a tube in it; a callous canal will be formed round that tube. Leave a catheter in the urethra, and no alteration of structure is produced. "Let us conclude," says Bichat, "from all these considerations, that the mucous and cutaneous systems only are so organized as to support the contact of foreign bodies without being affected by their presence, or at least without feeling any further effect than an augmentation of secretion, which is not at all dangerous. These two systems then form two limits, an internal and an external one, between which are placed the organs, whose structure, or peculiar sensibility, incapacitates them from bearing the contact of extraneous bodies. The influence of the excitation produced by such bodies reaches no farther than these boundaries; the other organs feel nothing of it. We may conceive that the acute sensibility possessed by these systems acts as a kind of sentinel, placed by nature at the confines of the organic domain of the soul, to warn it of the approach of every thing hurtful."

There are two points to be considered in the organization of the proper tissue of the mucous system; *viz.* a more or less thick stratum making up its chief bulk, and which, from its analogy to the corion of the skin, may be called the mucous corion; and a number of small prominences surmounting the latter, and called villi or papillæ. The epidermis is considered with that of the skin, under the article INTEGUMENTS. It does not agree in any respect with the colouring substance of the skin, which is placed between the papillæ and the epidermis. In fact, we know that in the black, as well as in the white races, this tissue is of a bright red, derived from the blood-vessels.

Mucous Corion.—This important part of the mucous tissue, which regulates the thickness, form, and very nature of the organ, has a soft and spongy appearance; it appears at the first view like a thick pulp, covering the dense cellular tissue which lies under it. Its softness distinguishes it from the cutaneous corion, which indeed resembles it but little in its intimate nature. Its thickness varies very considerably; in the gums and palate it is thickest, and decreases successively in the following organs, *viz.* the nose and stomach, small intestine and gall-bladder, large intestine, urinary bladder, urethra, and the various excretory tubes. When cautiously removed in the latter, it appears transparent, like a serous membrane. It is thinnest in the sinuses of the head, and the cavity of the ear. The lining of the latter has been generally called periostrum by anatomists; but its continuity with the pituitary membrane through the Eustachian tube, the mucous fluid that habitually covers it, and every circumstance that we can observe of its appearance and texture, shew that it belongs to the mucous system; and its diseases agree with those of that system. Diseases produce great changes in its thickness; and distention or contraction of the organs to which it belongs have analogous effects. The degree of softness which it exhibits, is very different in different situations. In the nose, stomach, and intestines, it is like velvet, and the name of villous coat characterises it very well. At the origins of the system, as the mouth, nose, glans penis, &c. it is much more dense, so as to approximate in its nature to the cutaneous corion. In the latter situations it is the seat of variolous pustules, which are often seen on the tongue, palate, and cheeks, but never on the internal mucous surfaces. It becomes dry and very thin by exposure to the air, but preserves a certain degree of resistance. The

muscular and serous coats of an intestine are pliable when dried, while the mucous covering is rigid. It is transparent after desiccation, in organs where it is naturally pale, as in the rectum and bladder; it exhibits a darker tint in parts where it is redder, as in the stomach, and has even a blackish cast when much blood is accumulated in it by preceding inflammation. It putrifies with great facility, and acquires a very fetid odour: this is one reason why the abdomen of a dead body passes so soon into the putrid state. In this change it acquires a greyish colour, and as the subjacent cellular tissue decays much more slowly, it may be removed by very slight pressure in the form of a disorganized and fetid pulp. Gangrenic attacks it much less frequently than the cutaneous tissue; yet it occurs sometimes, as in putrid sore throat. It yields very speedily to maceration; quicker indeed than any organ, except the brain. It is converted into a reddish pulp, very different from that produced by putrefaction in the open air. Ebullition extracts from it a greenish froth, very different from that produced by the muscular and cellular tissues. Before the water begins to boil, it curls up, but in a less degree than other structures. In fact the tissue soughlike then contracts much more than it, so as to throw it into a recurved state. In the same way, the contraction of the serous and muscular strata of the stomach during life, being much greater than that of the mucous, produces the numerous folds of the latter. A concentrated acid has the same effect. After having been dried for a long time, it still is curled up when plunged into boiling water. The valvulæ conniventes of the intestine, which disappear on drying, are then reproduced. Long ebullition brings it to a dark grey colour; it is not rendered softer, but may be more easily torn. In this respect it is contrasted with the subjacent cellular stratum, which preserves its power of resistance much longer. It never has the gelatinous appearance, which the cutaneous corion, the fibrous organs, cartilages, and other structures which afford much gelatine, present on boiling. The action of acids reduces it into a pulp much more quickly than any other tissues. Caustics act on it more rapidly than on the skin, where the epidermis protects the corion. Nitric acid, taken into the alimentary canal, produces a whitish fear on the mucous surface, which, when death does not follow suddenly, is gradually detached in the form of a membrane. All mucous surfaces, and particularly those of the stomach and intestines, have the power of coagulating milk. That of the former still possesses this power after desiccation.

Mucous Papille.—The peculiar mode of sensibility enjoyed by the skin is usually ascribed to its papillary structure, which is not very readily demonstrable. The sensibility of mucous membranes, analogous, in many respects, to that of the skin, arises probably from the same kind of texture, which is here more readily discerned. The existence of papillæ cannot be doubted at the origins of the system, and at the commencement of the cavities, as on the tongue, the palate, the alæ nasi, glans penis, &c. The villousities with which the internal surfaces are every where covered, must be regarded as an analogous organization; and the existence of an analogous sensibility on these surfaces strengthens the opinion. A very different function has generally been assigned to these villi; they have been regarded in the alimentary canal, as destined to the exhalation of various fluids, the absorption of chyle, &c. Bichat considers it incorrect to ascribe to an organ so similar in all parts such a diversity of offices. He considers that the microscopical observations, on which is grounded the opinion that the villi absorb the chyle, do not deserve much confidence, as different observers give such different reports. And he cannot account
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for the villi of the pituitary membrane, urethra and bladder, unless on the supposition of their being connected with the sensibility of the parts. The delicacy of the objects renders their structure so obscure, and their investigation so difficult, that the question can hardly be decided by direct observation. Analogy and observation of the vital properties must guide us in forming an opinion.

The papillæ exhibit very numerous varieties; they are remarkably long on the tongue, small intestine, stomach, and gall-bladder; less distinct in the œsophagus, large intestine, urinary bladder, and the excretory tubes; the latter, in fact, are almost completely smooth on their mucous surface.

Besides blood-vessels, exhalants, and absorbents, which enter into the structure of this system, as into that of all others, it presents another common organ of a glandular nature, which is generally insulated, but here forms part of the system. The mucous glands probably exist throughout the system. Situated under the corion, or in its substance, they constantly pour out a mucilaginous fluid, which lubricates the free surface of the membrane, protecting it from the action of the bodies that come in contact with it, and facilitating their passage. They are very apparent in the trachea and bronchi, the œsophagus and intestines; they cannot be shewn in the urinary and gall-bladders, the uterus, the vesiculæ feminales, &c.: their existence in these organs can therefore only be inferred from the circumstance of a mucous fluid being produced analogous to what is found where the glands are manifest.

If we admit the force of this reasoning, and allow that identity of the secreted fluid proves identity of the secreting organ, we shall establish as a striking difference between the mucous and serous membranes, that the fluid of the former is produced by secretion, that of the latter by exhalation. Their size varies in different organs; they are largest in the lips, cheeks and palate. They generally have a rounded form, are dense in their texture, and surrounded by cellular substance, but contain very little of that substance in their interior. Little or nothing is known of their diseases. For further particulars, see GLAND.

A difficulty occurs in ascertaining the composition of mucous fluids, because they are formed in very small quantity in health, and are probably changed in their composition when increased in quantity in disease. They are generally insipid, colourless, and tenacious; but their colour, viscidinity, and odour, differ in different organs. For a further chemical account of them, see MUCUS.

Their use in the animal economy is obvious: they protect the mucous surfaces from the impressions of those heterogeneous substances, with which they are all in contact, by forming a stratum, which compensates for the extreme thinness or even the entire absence of epidermis. Hence they are more abundant where foreign matters lodge for some time, as in the alimentary canal, than where they only pass occasionally, as in the excretory tubes. For the same reason, they are poured out more abundantly where any foreign body of an unusual kind is left permanently in contact with a mucous surface, as a catheter in the urethra, a tube in the trachea, &c. In all these cases the effect must be referred to an irritation of the excretory orifices; for the body does not come in contact with the glands themselves.

By the secretion continually going on in the mucous membranes, they perform another important part in the animal economy. They are one of the great emunctories, by which the residue of nutrition is carried off, and, consequently, one of the principal agents in that habitual decomposition, which the solids of the living body are constantly undergoing. All

the mucous fluids are rejected from the body; that of the ureters, bladder, and urethra, with the urine; that of the alimentary canal with the feces, which are often very copious when nothing is taken in by the mouth; &c. If we consider that the two mucous surfaces, taken together, are of equal, if not greater extent than the skin, we shall deem their functions very important in this point of view. When these fluids have remained for some time in rather considerable quantity on their respective surfaces, a disagreeable sensation is produced, and leads to their expulsion in various ways. The air-passages are cleared by coughing; the stomach by vomiting, &c. Mucous membranes possess a great number of blood-vessels, and are hence distinguished by a remarkable redness, which however is not an uniform character. In the sinuses of the head, and the internal ear, they are whitish, and appear the more so, because their extreme thinness allows us to discern the bone, on which they are applied. In the bladder, the large intestine, and the excretory tubes, the colour is deeper, but still pale. In the stomach, small intestine, vagina, pituitary membrane, and mouth, the redness is strongly marked. It arises from a vascular network, the branches of which, after being ramified in the mucous corion, are expanded in a state of very minute division on the mucous surface. Their unsupported position makes them liable to rupture on the application of any force, as in the bronchi from coughing, in the ear and nose from blows on the head, &c. The passage of stones will produce bleeding from the ureters or bladder, and that of catheters from the urethra.

The superficial situation of these vessels enables us to judge by them of the state of the circulation; hence the lividity of the lips, nose, &c. in asphyxia.

Whether the quantity of blood in the mucous membranes be constantly the same, and particularly whether it varies in those organs, which are seen in very different states of contraction and dilatation, as the alimentary canal, are points concerning which we possess hitherto no means of judging.

The number of blood-vessels belonging to the mucous system, the fact that the blood is changed in respiration by exposure to the air through its containing vessels, and that it will also become red when placed in a bladder immersed in oxygen, led to an inquiry whether any change is produced by the air in the blood of mucous surfaces. Bichat could not discern any alteration from enclosing oxygen gas in a portion of intestine, or from making it pass backwards and forwards through a part of the canal.

This author conceives, that the red colour of the mucous is analogous to that of the muscular system, and derived from the colouring matter of the blood combined with the tissue of the part; except at the origins of these surfaces, where the cause of colour is principally in the blood contained in the vessels. Asphyxia does not affect the deeply-seated parts, so much as those which are superficial, and communicate with the skin; the latter become suddenly white in syncope, where the heart sends no more blood into the arteries. Repeated washings take away the red colour; and sudden whiteness is produced by immersion in boiling water or in acids. It is, on the contrary, increased to a remarkable degree of intensity in inflammations, on account of the increased quantity of blood accumulated in the capillary system.

It is a question, whether exhalation takes place on mucous surfaces: the analogy of the skin seems to indicate that it does. The pulmonary vapour, which is best seen when condensed by cold air, has been generally referred to the

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exhalants of the air-passages; the gastric fluid, and fluid of the intestines, has been ascribed to the same source. It seems difficult to arrive at any certainty on such a point.

There is a great tendency in the exhalant vessels of the mucous organs to allow the passage of blood; hemorrhages without rupture are very frequent in them.

That absorption is carried on from mucous surfaces is proved by numerous familiar phenomena; *viz.* by the chyle and fluids taken up from the stomach and intestines; by the vapour of turpentine from the lungs; by the removal of the aqueous portions of the bile and urine, &c. This absorption is by no means constant and uninterrupted, as in the serous membranes; it exhibits numerous varieties according to the state of the vital powers of the part.

The origins of the mucous system, where the animal sensibility is clearly marked, and serves, as in the skin, to establish our relations with external bodies, possess cerebral nerves. In the pituitary and palatine membranes, the conjunctiva, the rectum, glans, prepuce, &c. this fact is evident; hardly any nervous twigs from the ganglia are seen in these situations. The latter, on the contrary, predominate in the intestines, the excretory tubes, the reservoirs of secreted fluids, &c. where the organic sensibility is more marked.

Properties of the Mucous System.—The extensibility and contractility of tissue are much less extensive in this system than they would appear to be on the first view, on account of the numerous folds which it presents in the hollow organs, when they are contracted. Yet these properties are very apparent under certain circumstances; the excretory tubes are often distended much beyond their natural size; the ureters sometimes are almost as large as an intestine, and the ductus choledochus and the pancreatic duct exhibit similar enlargements. The urethra and salivary ducts, on the contrary, do not readily yield to distention.

These properties are called into action very rapidly in the mucous system; the stomach, intestines, bladder, &c. pass in a moment from a dilated to a contracted state.

When mucous canals are no longer traversed by the fluids which are habitual to them, they remain permanently contracted, but are not obliterated on account of the presence of their mucous secretions. This fact may be observed in the intestinal canal in the case of artificial anus, in the urethra when the urine has run for a long time through the wound made in lithotomy, &c. Neither do they contract adhesions under inflammation, as is the case in serous cavities, and in the cellular tissue. The importance of this circumstance to the great functions of life is very obvious: the mucous cavities would be rendered useless if they were subject to the frequent adhesions which we observe in pleurisy, peritonitis, &c.

Vital Properties. 1. *Properties of the Animal Life.*—Like the integuments, mucous surfaces are constantly in contact with external bodies, and therefore require a sensibility, which may enable the mind to perceive the relations between us and those bodies, particularly at the origin of the surfaces. Hence the animal sensibility exists there in a very marked degree. In many places it is even superior to that of the skin, which possesses no feeling so lively as those produced by odours on the pituitary membrane, by favours on that of the mouth, on the vagina, urethra, and glans, at the moment of coition, &c. This sensibility, like that of the skin, is subject to the powerful influence of habit, which constantly tends to render our sensations less lively, and brings to a state of indifference the pleasure and pain which they produce. A catheter left in the urethra, produces at

first great pain; it becomes less and less troublesome, and is at last hardly felt. Pessaries in the vagina, tents in the rectum and other situations, &c. are further proofs of this fact. On this observation is grounded the possibility of keeping tubes in the trachea and œsophagus, for carrying on the functions of respiration and deglutition. This remarkable influence of habit is exerted only with respect to sensations produced by simple contact, and not such as are caused by actual injury, as cutting, tearing, &c.; hence it does not make the bladder less sensible to the excruciating pain of the stone, the nose to a polypus, or the trachea to a foreign body accidentally introduced. To this effect of habit we may probably refer in part the gradual diminution of the functions of the mucous system in old age. The active sensibility of the alimentary, biliary, urinary surfaces, &c. in the young subject, is the chief cause why the digestive and secretory phenomena succeed each other so rapidly: the same phenomena take place more slowly in an old person, from the sensibility being rendered more obtuse by the habit of contact.

The animal sensibility, which is acute at the origins of the mucous surfaces, as in the mouth, nose, glans penis, opening of the rectum, &c. is less marked in the more deeply-seated organs. In the former parts we always perceive the bodies that come in contact, but there is no such perception in the latter. Does this arise from the uniformity of the impression in the latter case affording no term of comparison? For each of these organs is brought into contact with one kind of substance only, while the others are exposed to a variety of excitations. In fact we perceive impressions made on the deeply-seated organs, when they are brought into contact with extraneous bodies; as when a catheter is introduced into the bladder, &c.

The sensibility of the mucous system is much increased in disease; acute catarrhs are very painful. We not only perceive the contact of bodies then, but find it very distressing. Yet the sensibility in these cases never rises to the point which it reaches in inflammations of the cellular, serous, fibrous, and other tissues.

The mucous system exhibits no animal contractility.

Properties of the Organic Life.—The organic sensibility and the insensible contractility are strongly marked in the mucous system. They are called into action by four different causes: 1, by the nutrition of the system; 2, by the absorption, which either takes place naturally, or accidentally; 3, by the exhalation; 4, by the continual secretion of the glands. These two properties are the primary causes of all these functions, the augmentation or diminution of which indicate their degree of activity. As numerous causes are constantly acting on the mucous surfaces, particularly at their origins, this degree is very frequently changing, as well as the functions which result from it.

The mucous system then differs from most others, in having its organic properties habitually more active, on account of the more numerous functions, over which they preside; and in having them change so frequently from variations in the excitation applied to them. In the bony, fibrous, cartilaginous, muscular, nervous, and other systems, these properties are only called into exercise by nutrition; and, on the other hand, no excitation can be applied to them; so that the properties remain permanently at the same degree.

From the preceding view, we cannot be surprised that the diseases, which particularly put in action the organic sensibility, and the insensible contractility, should be so frequent in the mucous organs. All the catarrhal affections,

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whether acute or chronic, the hæmorrhages, the various tumours, polypi, funguses, &c. all kinds of excoriation, ulcers, &c., which are seen in these organs, arise from the various alterations of which the organic properties are susceptible.

The mucous system does not seem to possess the sensible organic contractility; yet it sometimes exhibits phenomena, which seem to indicate something more than the insensible oscillations which compose the insensible organic contractility. The parotid duct sometimes throws out its contents to some distance from the mouth, although it seems entirely of a mucous structure, and has no muscular agent of impulsion at its origin. Perhaps the excretory ducts of the glands, which open on the deeply-seated mucous surfaces, exhibit the same phenomenon, which has been observed in some degree in the lactiferous tubes. These motions, analogous to those of the dartos, the cellular tissue, &c. seem to hold a middle place between those of tonicity and irritability.

The sympathies of the mucous system are very numerous.

Active Sympathies.—When any part of this system is inflamed or irritated in any manner, all the vital powers may be separately called into action in other systems. Sometimes the animal contractility is exerted; thus the muscles of respiration produce sneezing or cough, when the pituitary or bronchial membrane is irritated; or even when the surface of the stomach is affected. A general spasm is observed, when a foreign body lodges about the glottis. Stone in the bladder causes contraction of the cremaster. In other cases the animal sensibility is excited by affections of the mucous surfaces. Stone in the bladder produces itching of the glans penis. And a similar effect is produced in the nose by worms in the intestines.

The sensible organic contractility may be sympathetically excited by affections of the mucous system. The organic muscles generally contract from the excitation of a contiguous mucous surface. A stone in the pelvis of the kidney, or irritation of the uvula, produces vomiting. The action of the heart is accelerated when the seminal fluid is passing over the urethra.

Sympathy of the organic sensibility is exemplified in the furred tongue, connected with the affections of the stomach, in the hæmorrhages which supply the place of suppressed menstruation, in the diminution of the cutaneous transpiration observed by Sanctorius at the time of digestion, &c.

Passive Sympathies.—In various diseases, a sensation of burning heat is felt in the mouth, stomach, and intestines, although these parts do not seem to be actually hotter than is natural.

Cold bodies applied to the neighbouring skin stop bleeding from the nose and uterus. Most catarrhs seem to be produced by the action of cold on the skin. A cold atmosphere confines the functions of the skin, and occasions those of the mucous system to be proportionally extended. The pulmonary exhalation is more strongly marked, the internal secretions more abundant, digestion more rapid, and the appetite consequently more easily excited. In warm seasons and weather, on the contrary, the skin acts more powerfully, the secretions, particularly of the urine, are diminished, the digestive phenomena proceed slowly, and the appetite is recovered more difficultly. In scarlet fever the throat is remarkably affected. In the last stages of organic diseases of the viscera, as of the lungs, heart, liver, in cancers of the uterus, &c. the mucous membranes are usually affected: hence the colliquative diarrhœas so common in these cases.

Character of the Vital Properties.—In this system, as in the

skin, the vital properties are almost permanently in action, as it is constantly in contact with substances that affect it in some way or other. But they are not the same in all parts: they undergo, in each, particular modifications, arising probably from the differences of structure already pointed out, in the nature of the corion, the disposition of the papillæ, the distribution of the vessels and nerves, of the glands, &c. We see how widely the animal sensibility of the pituitary membrane differs from that of the mouth, how the urethra and glans are affected by the passage of the seminal fluid, which would make no impression on any other mucous surface. Each part bears a certain relation to the fluid which habitually covers it, and could not bear the contact of others without pain. The urine would excite the stomach, and the gastric juice the bladder; the bile, which remains quietly in the gall-bladder, would irritate the pituitary membrane, or vesiculae seminales.

From these varieties in the vital powers of the different divisions of the mucous system, we naturally derive the differences observed in the diseases affecting this system. To the same cause we must also refer the differences of the sympathies. Each part has a peculiar sympathetic action on other organs. Irritation of the pituitary membrane alone causes sneezing; that of the fauces, vomiting, &c.

Development of the Mucous System.—It is proportional, in general, to that of the organs to which it belongs, and is, therefore, earlier in the gastric apparatus, later in the pulmonary organs, and still more so in those of generation. The tissue is very delicate, and the papillæ hardly sensible in the fœtus. Its redness is not so clearly marked: less blood penetrates it, because the functions, of which it will at a future time be the seat, are either exerted feebly, or have not yet commenced. At this time the cutaneous system is in the opposite state with respect to the quantity of its blood. The mucous surfaces are often livid from the nature of the blood contained in their arteries. Its adhesions to the surrounding parts are weaker: hence it may be drawn out of the intestines in an entire piece.

At the time of birth respiration and digestion begin suddenly, and the secretions are increased: hence the mucous system exhibits a remarkable degree of activity. New substances come in contact with it, and stimulate it: red blood enters its vessels, augments its energy and sensibility, and renders it more fit to receive impressions. When the internal functions are once established in a state of activity, the mucous surfaces exhibit no further sudden changes. They act with considerable energy during the time of youth. Active hæmorrhages are frequent, as those of the nose, air-passages, and even of the stomach: yet, in general, they are not frequent in the organs below the diaphragm. They are much more common in men in the gastro-pulmonary, than in the genito-urinary surface: in women, on the contrary, who have a natural evacuation of blood from one part of the latter surface, they are most frequent in it: at the epocha of puberty, the development of the organs of generation in both sexes gives an increased activity to one part of the genito-urinary surface: but this is not accompanied with any debilitation of other parts, all of which, on the contrary, seem to acquire at this time a more energetic action. The mucous system becomes thicker and firmer in the years subsequent to puberty. Its vital energy still predominates for some time in the superior surfaces; but, as age advances, this predominance, as well as that of other organs, is transferred to the abdomen.

Numerous causes change the state of this system during life. It will hardly be found to exhibit the same colour, density,

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density, or external appearance in any two subjects. This may be seen in any particular surfaces, as that of the stomach for example.

The redness of the mucous system is clearly marked till the thirtieth year; beyond this time it changes. It receives less blood, grows more and more pale, and becomes more dense in the old subject. The remarkable soft and villous touch is no longer perceived. The vital powers grow languid; yet the mucous glands often separate their fluids abundantly, and even in increased quantity. Absorption takes place difficultly at this time from mucous surfaces, as from all others. The chyle is taken up more slowly; so that the digestion is longer, and contagious diseases are less readily taken.

The serous membranes consist of two kinds essentially distinct from each other. The first includes the pleura, pericardium, peritoneum, arachnoid, tunica vaginalis, and in general all the membranes of the great cavities. These are the proper *serous* membranes. The second comprehends the membranes that line the joints, and those which form the bursa mucosa, which may go by the common name of *synovial* membranes. These two kinds are joined in one class on account of their both possessing the external character of forming a bag without openings, of their being composed of cellular tissue, and being the seat of alternate exhalation and absorption. A strong line of demarcation is established by the different nature of the fluid that lubricates them, by the synovial membranes being exempted from the general dropsical affections of the serous, and of the cellular tissue, and *vice versa*.

The serous membranes generally cover the outside of those organs which are lined by mucous membranes, as the stomach, intestines, bladders, lungs, &c.; and it surrounds all those which are essential to life, as the brain, heart, gastric viscera, &c.

It does not form, like the mucous system, a surface every where continuous over the numerous organs to which it belongs; but its different divisions are insulated, and these are rather numerous. When taken altogether they surpass in extent the mucous surfaces. The particular membranes vary considerably in their extent, from the peritoneum, which is the largest, to the tunica vaginalis, which is the smallest. When taken altogether, they would form a surface greater than that of the skin.

Every serous membrane represents a bag without an opening, extended over the various organs which it includes, which may be either very numerous, as in the peritoneum, or single, as in the pericardium. It covers the organs in such a manner that they are not contained in its cavity, and that, if it were possible to dissect it completely off from them, it would form a perfect bag. In this respect it may be compared to the double night-cap, of which the part immediately covering the head is analogous to the serous membrane investing an organ, and the portion in which this is included represents the lining of the cavity in which the organ is contained. From this description, it will be readily understood, that the serous membranes do not open to allow a passage to the vessels or nerves which arrive at, or depart from, their respective organs, but that they are always reflected over them, accompanying them to the organ, and forming a sheath round them. This arrangement prevents the serum, which lubricates the serous cavities, from gaining admission into the neighbouring cellular substance, which it would do with great facility, particularly in dropses, if the serous membranes, like the fibrous, were perforated for the passage of vessels and nerves.

From the general idea which we have given of these membranes, it will be easily understood that each of them is composed of two parts, distinct although continuous; the one lining the internal surface of the cavity in which it is found, the other covering the organs belonging to the cavity. Thus, there is a pleura costalis and pulmonalis, a portion of peritoneum lining the abdominal parietes, and another covering the abdominal viscera, &c.

The imbricated end of the Fallopian tube offers the only example of a continuity between a serous and a mucous surface.

In every serous membrane there is a free surface, contiguous with itself at all points, and another adhering to the surrounding parts. The former is remarkable for its perfect smoothness and polish, which distinguishes this system and the following from all other membranes. All the organs, which have this polished surface, owe it to a serous covering: many have such a covering only on some part of their surface, and are rough elsewhere, as the bladder and liver.

The free surfaces of the serous membranes completely insulate the parts, over which they are expanded, from the surrounding organs, so as to form a kind of boundaries or barriers, if that term may be employed. Hence the great viscera, confined by their serous coverings, and suspended in the bags which they form, communicate with the adjacent parts only at the points where their vessels enter: in all other situations there is contiguity, but not continuity with the surrounding organs. This insulation of position coincides with the separate vitality of the organs. Each has its peculiar life, resulting from the particular modification of its vital forces, which establishes corresponding peculiarities in its circulation, nutrition, &c. No part feels, moves, or is nourished like another, unless it belong to the same system: every organ displays, on a small scale, the phenomena which appear on a larger plan in the animal economy: each takes from the circulating fluid the matter which suits its nature, prepares this matter, returns to the mass of the blood what is heterogeneous to it, and appropriates what can furnish it with the right nourishment: this, in fact, is digestion. Hence it is an important use of the serous membranes to contribute to this independence of the vital powers and functions of the organs. In the same way the serous coverings insulate the morbid affections of a part.

The smoothness of the free surface of the serous system facilitates the motions of the organs which it covers: the cellular substance is the principal means by which the movements of external parts are provided for, while these membranes are particularly designed for the internal organs.

This surface differs essentially from the corresponding one of mucous membranes, in the circumstance of its very frequently contracting adhesions. The pleura is hardly free from them in any subject: the peritoneum comes next, then the pericardium, the tunica vaginalis, and, lastly, the arachnoid, in which they are the most uncommon. They are seen under various forms. 1. The costal and pulmonary pleurae may be completely united so as to form apparently but one membrane. 2. They may be joined so loosely that very slight force is sufficient to detach them: the opposed surfaces, when detached, have lost their polish and smooth surface. 3. The two pleurae may be united by longer or shorter bands, having the same organisation, and the same highly polished surface, as the membranes which they join together. 4. The adhesion may be of a flocculent nature, and resembling cellular substance. 5. Depositions of coagulating lymph may join the two membranes: but these are foreign to the surfaces.

The external surfaces of serous membranes adhere in almost all cases to the surrounding organs: in a few instances these membranes are insulated on both sides. Yet, although they adhere to their respective organs, their organization is not connected with that of these parts. They sometimes, by turns, cover and leave uncovered the organ to which they belong: the broad ligaments of the uterus serve as a serous membrane to that viscus during pregnancy. The peritoneum lining an enormous hernial sac, has previously lined the abdomen. Since then the organs and the serous membranes can exist independently of each other, there is no reciprocal connection in their organization. The medium of union is cellular tissue, and not a vascular apparatus. The membrane may be, and generally is, affected independently of the organ, and *vice versa*: this is seen in the intestine in peritonitis and diarrhœa. Hence we may infer, that the organization and the life of the serous membranes are entirely independent of the organs which they surround. Yet, in some cases, they are inseparably attached to the subjacent parts, as the tunica vaginalis to the albuginea, and the arachnoid to the dura mater.

The smooth surface of every serous membrane is moistened with a fluid very similar to the serum of the blood. It is constantly poured out by the exhalants, and removed by the absorbents. It is a simple moisture in the natural state, and is dissolved in the air, and rises in the form of vapour from serous surfaces exposed in living or recently killed animals. It is more abundant in the dead subject, as it is increased by the fluids transuding through the blood-vessels after death; and its augmentation during life causes dropsies of the various cavities. In the first stage of inflammation the serous exhalants produce no fluid: as they remain thus preternaturally dry, and are very sensible, motion is highly painful. At this time adhesions are formed. If the affection continue, suppuration ensues, but the membranes are never ulcerated. Their tissue is thickened, and pus is poured out by their exhalants. This fluid varies in consistence from a milky serum to a complete and thick stratum of coagulating lymph, which adheres to the surface from which it has been exhaled.

The fluids of the serous system are plainly of an albuminous nature. One of these membranes plunged into boiling water is covered with a whitish stratum of concreted albumen. This substance predominates in the fluid of dropsies. The flocculent matters, which often float in such fluids, the new membranes, and the white substance, which sometimes gives them a milky appearance, are merely albumen in various states of consistence.

Organization of the Serous System.—It is characterized by a whitish shining colour, and a remarkable transparency: the thickness varies, but is never considerable in the natural state. It consists of a single layer, from the surface of which cellular strata may be removed, but which can never be divided into two or more portions. No pellicle is raised from it by the action of a blister.

The organic systems are formed, 1st, of common parts, as cellular membranes, blood-vessels, exhalants, absorbents, and nerves, which form the ground-work, or as it were the skeleton of the part; 2dly, of a peculiar substance deposited in this, as, for example, gelatine and phosphat of lime in the bones, fibrine in the muscles, &c. The organs, therefore, resemble each other in their common parts, and are distinguished by their peculiar tissues. The serous system seems to possess no peculiar tissue; it contains only the common parts. Cellular in its nature it differs from that system only in its form: the cells, instead of being separate and distinct, are here approximated and condensed.

The continual exhalation and absorption of lymph belong to both these tissues, and the phenomena of dropsy are common to them both: this identity of functions and effect leads us to infer an identity of nature. Maceration in water resolves these membranes into cellular tissue; and facile inflation under them produces a somewhat analogous effect. Cysts, hydatids, &c. are formed in both. Nothing of a fibrous nature is observed in serous membranes, nor in the cellular tissue; although fibres of some kind characterize the other organs.

These proofs of analogy, or even of identity of structure between the cellular tissue and serous membranes, are corroborated by the effects of various reagents, which are exactly similar in both cases. A serous membrane dried becomes transparent, does not turn yellow like the fibrous membranes, still remains flexible, and gradually returns to its former state when immersed in water. It putrifies much more slowly than the parts which it covers, and resists maceration for a very long time, as may be seen in the delicate membrane of the omentum. It is curled up by boiling water like the fibrous system, but furnishes much less gelatine, and does not turn yellow. The ordinary chemical agents operate in the same way on both parts.

When it putrifies in the open air, it does not turn green like the skin, but becomes dull and of a deep grey. When it sloughs during life, it is black; in the latter case it contains much blood, and hence the source of its dark colour. The peritoneum is almost the only instance in which this gangrene occurs.

Yet there are circumstances of difference that distinguish the serous and cellular systems. Their external appearance is not the same. In the cellular tissue there is nothing analogous to the slow inflammation, accompanied with the production of small tubercles, which particularly characterizes serous membranes, as milary eruptions characterize the skin, and aphthæ the mucous surfaces. The pus formed by the cellular organ is not the same as the fluid produced by serous surfaces.

The exhaling vessels which produce the fluid just described are easily demonstrated. Withdraw an intestine from the abdomen of a living animal; you see no vessels in the serous surface, but it has a rose-coloured tint from those which lie under it. If you irritate it, return it into the abdomen, and draw it out again after some hours, it exhibits a number of reddish streaks, which are the exhalant vessels; these could not be seen in the natural state from the transparency of their contents. Minute injections have a similar effect on the serous membranes, and the injected fluid is often thrown out on the surface, probably from the exhaling orifices.

A large portion of absorbents enters into the composition of serous membranes, which may probably be regarded as an intertexture of these vessels and exhalants, united by cellular tissue. The mouths of these absorbents can no more be directly demonstrated than those of the exhaling vessels; but phenomena very clearly prove their existence. They are seen in the dead subject loaded with fluids taken up from the cavities to which they belong, as in the different dropsies, or in effusions of blood. Coloured fluids thrown into the serous cavities are said to be absorbed; but Bichat says that the colouring matter is not taken up. During life they often carry off very large watery effusions in a short time.

Serous membranes contain very few blood-vessels in their natural state; so few, indeed, that Bichat almost doubts their existence. Numerous trunks run in the cellular tissue of their external surfaces, but these may be removed by dissection, without injuring the membranes. In the omentum

the existence of blood-vessels cannot be questioned; and in all cases they must be connected to the membranes through the medium of the exhalants.

Although the serous system is distinguished by certain general characters, the particular membranes differ considerably: each has its peculiar structure, suited to its situation and offices. The transparent arachnoid, yielding to the smallest force, is strongly contralled with the dense and strong peritoneum. Different parts of the same membrane are differently organised. The omentum is not like the rest of the peritoneum; and the two portions of the tunica vaginalis are very different. Hence we shall not be surprised at finding great varieties in the diseases of these membranes. Nothing is more common than inflammation of the pleura; that of the arachnoid is rare. The symptoms are different in inflammation of the pericardium, tunica vaginalis, and peritoneum; the Dropsies are very different, &c. Yet there is a common character in the affections, arising from analogy of organisation. The large serous collections, and the slow tubercular inflammation, belong especially to these membranes: the mode of adhesion is peculiar to them.

Properties of the Serous System.

1. *Properties arising from Organisation.*—The extensibility and contractility of tissue are less extensive in the serous membranes, than we might have supposed on the first view of the enormous dilatations which the organs covered by them occasionally exhibit, and of the facility with which they recover their original size. The folds of the membranes, which are particularly marked near organs susceptible of considerable variety in size, as in the abdomen, are separated as the organs enlarge, and contribute to their covering. Yet a considerable extension takes place in many cases, in the peritoneum in ascites, in the tunica vaginalis in hydrocele. The contractility is proportional: those membranes are restored to their original state when the distending fluids are removed. After very long extension they do not recover completely: the tunica vaginalis is flaccid when emptied, and the peritoneum in old dropsies.

2. *Vital Properties.*—Removed by their situation from the action of external bodies, the serous membranes do not enjoy, in their natural state, those properties which establish relations between such bodies and the living organs; they have no animal sensibility nor contractility. Hence they would not serve the office of integuments to the body, nor the purpose of lining the organs in the place of mucous membranes: they would give us in short no other sensation than that of an obscure and indistinct feeling. Living animals exhibit no signs of pain when these membranes are irritated. External bodies brought in contact with serous membranes excite inflammation in them: and this method is employed in surgery for producing artificial adhesions of their sides. When inflamed, animal sensibility is developed in them to a very high degree; these are among the most painful affections to which the body is subject.

This system does not possess the sensible organic contractility; but the insensible organic contractility, and the corresponding sensibility, are kept in permanent exercise by the exhalation and absorption habitual to this system, and by nutrition. The two latter properties predominate, and the morbid affections consist in alterations of them. Hence are derived acute and chronic inflammation, adhesions, effusions of various fluids, &c. It is these, also, which are called into action in sympathies; so that whether they are diseased idiopathically or sympathetically, serous membranes exhibit always a series of phenomena arising from an increased interior motion, or from a loss of power in the

exhaling and absorbing vessels, and in the proper tissue; while in the animal and organic muscular systems, the prevailing affections, marked in the one by convulsions and paralysis, in the other by irregular motions of irritability, do not indicate any such alteration of the tissue of the organ. Hence the latter systems, although frequently affected during life, present very few morbid changes after death, while the serous affords a vast field of observation to the morbid anatomist.

Sympathies.—The serous surfaces are often influenced by the affections of other organs. This is obvious in the organic diseases of the heart, lungs, liver, &c. which, although these parts are entirely unconnected in functions with the serous organs, are almost always accompanied, in their latter stages, with collections of fluid in the large cavities.

Development of the Serous System.—All the serous membranes are extremely thin in the fœtus; and the fluid which lubricates them is more unctuous, so that it seems to approach in its qualities to the synovia. Their growth corresponds to that of the organs which they cover. We cannot observe any marked change in their functions at the time of birth. For a considerable time they are extremely thin and transparent, but they afterwards grow thicker, and assume a dull colour.

This system remains unchanged for a long time in the adult. The different membranes in their affections follow the same laws as the organs which they surround: thus the serous surfaces of the chest are most frequently affected in young, and those of the abdomen in older subjects.

The membranes become more dense and firm, and adhere more strongly in old persons. Their powers become weakened, absorption is performed more languidly, and dropsies occur.

The *synovial* system presents two principal divisions; one belonging to the articulations, the other to the tendinous sheaths.

Synovial System of the Articulations.—The formation of the synovia has been very commonly ascribed to the masses of fat found in the neighbourhood of the articulations, and has been regarded as a species of secretion. These masses, which have been called synovial glands, consist apparently of a merely adipous texture, covered by the synovial membranes, and so placed as not to be subject to any considerable pressure in the motions of the joint. It was said, that the synovia was poured out by fringed processes projecting from their surfaces into the cavities of the joints. The following considerations will convince us that the synovia cannot be formed from this source. The bodies called synovial glands are not found in all the joints, and they do not exist in the sheaths of tendons. We can discover nothing in them but masses of fat: inflation or maceration demonstrates the cellular tissue belonging to them, and ebullition removes the fat, leaving nothing but collapsed cells like common cellular substance. They contain no trace of any glandular structure, nothing of that peculiar parenchyma, unknown in its nature, but remarkable in its structure, which distinguishes all glandular bodies. No excretory duct can be shewn in any of them. They do not exhibit in any case such diseased alterations as other glands display, but participate only in the general affections of the surrounding cellular tissue.

Another source has been assigned to this fluid in the transudation of the medullary substance of the bones through their extremities: this explanation is so mechanical, so unlike any vital process, and so inconsistent with all our views of the functions of the animal economy, that it is unnecessary to refute it formally.

We must then consider the synovia as produced by exhalation from the vessels of the membranes. In this point of view it may be compared to the serum of serous surfaces, to which it is analogous in its albuminous composition, in its function of lubricating the surface, on which it is deposited, in its increased deposition under certain circumstances, and in its being taken up from the cavities by absorption.

The synovia is a transparent and viscid fluid: it is tenacious, so as to be drawn out into strings when touched with the finger, and has a slippery unctuous feel, which renders it very fit for the purpose of lubricating the articular surfaces, and making them glide easily against each other in the motions of the joint. Its quantity is not uniform in all joints; in the ankle, hip, shoulder, elbow, &c. it is abundant; while its existence can hardly be observed in the sterno-clavicular, sterno-costal and collo-vertebral articulations. This difference does not arise from the smallness of the surfaces; for some small joints contain much synovia. The quantity is always the same in the same joint; it cannot be increased, like the serous fluids, by transudation after death, nor is it, like them, influenced sympathetically by affections of other organs. It never exhibits those changes in appearance, which are so frequent in the fluid of serous cavities, as the milky turbid state, the white flocculi, the false membrane of coagulating lymph.

The synovial membranes, which constantly deposit and absorb synovia, belong to the joints of the body in the same manner as the serous membranes do to the great cavities. Each of these organs is therefore to be regarded as an entire bag expanded over the parts which form the joint; that is, over the surfaces of the articular cartilages of the ligaments, and the masses of fat called synovial glands, and including the inter-articular ligaments, when such exist, in complete sheaths. The various organs composing joints owe to it their smooth, polished, and shining surface. We can conceive the possibility of removing it from them by dissection, in which case it would form a bag without any opening. All the organs, over which it is expanded, are on its external surface, as the different viscera are on the outside of their respective serous membranes.

A synovial membrane is found in all moveable articulations; indeed, its office is so essentially connected with the motion of the part, that it may be deemed a necessary constituent of these joints. A fibrous capsule belongs to very few joints; the hip and shoulder offer examples of it. These joints possess two very distinct coverings. The external is fibrous, and represents a bag open above and below: it embraces, by its two openings, the surfaces of the two bones, and is continued into their periosteum, the fibres of the two organs being interlaced. The other is the synovial membrane, lining the former, and separating from it at its attachment to the bones, to be reflected over the articular cartilages. To the former, if to any part, the term capsular ligament should be applied; it must lead to very incorrect notions to give this name to the synovial membrane, the structure and functions of which are so foreign to those of ligaments.

Other joints have no fibrous capsule; the ligamentous fibres, instead of assuming the membranous form, are collected into fasciculi. The internal layer, or that composed of the synovial membrane, exists here, as in the former joints, and has exactly the same disposition with respect to the capsule, which it forms round the joint, and its reflexion over the articular heads. In these joints, too, anatomists often call it the capsular ligament. It has the

same function in both kinds of articulation; that of secreting the synovia and confining it to the surface of the joint.

Simple inspection is sufficient to prove the existence of the synovial membrane in joints, where it exists alone, that is, not covered by a fibrous capsule. It can be very easily demonstrated in certain parts of other joints, as on the ligamentum teres, the synovial gland, and the neck of the femur in the hip, as well as where it is reflected from the fibrous capsule to the cartilaginous surfaces. On the surface of the fibrous capsule, and on the articular cartilages in all joints, its adhesion is so strong, that doubts may be entertained of its existence. It sometimes appears uncovered at some interval between the fibres of a capsule; and careful dissection, with maceration, enables us to detach it. The smooth surfaces of ligaments and cartilages can be owing only to a covering of this membrane, for those parts cannot derive that property from their own structure; articulations, which have no synovial membrane, have not this smooth surface, as the symphyses of the pelvis.

When a part passes through a joint, as the tendon of the biceps at the shoulder, the synovial membrane is reflected over it, so that there is no opening for the synovia to escape through.

As the form and office of the synovial strongly resemble those of the serous membranes, the organisation is also analogous. It is chiefly cellular, as we may prove by dissection, inflation, and maceration. Its external surface is every where covered by cellular tissue, which we find gradually more and more condensed as we approach the membrane. No kind of fibre can be distinguished in it. It has a degree of transparency when dissected out of a joint. In all points of its texture, in its exhalants and absorbents, it resembles the serous membranes.

Properties.—The extensibility and contractility of tissue are seen in the distention of joints in the hydroys articulari, and their subsequent return to their original size. The membranes admit, however, only of a gradual extension, and are torn by the sudden force applied in luxations.

Organic sensibility is the only vital property which they possess in the ordinary state; no sign of pain is produced, when they are exposed and irritated in living animals. Inflammation increases this sensibility and converts it into the animal kind; most excruciating pain is experienced from inflamed joints. The exhalation and absorption constantly carried on by these membranes, prove that they possess the insensible contractility.

These membranes are not affected by diseases of other organs. In acute diseases of important viscera, while the skin, the mucous surfaces, the cellular tissues, the nerves, &c. exhibit a greater or less sympathetic disturbance, the synovial membranes are completely quiet. In this respect they resemble the bony, cartilaginous, and fibrous systems.

Development of the Synovial System.—The membranes are proportionally large in the fœtus and child, because the articular surfaces are large; they are also very thin. There is nothing peculiar in the synovia. The membranes grow more dense, and less transparent, in the old subject, and produce less synovia: they acquire a rigidity, which is unfavourable to motion. But they do not become ossified.

Synovial membranes are sometimes accidentally developed. When the head of a bone is dislocated and not replaced, a smooth moist cyst is formed round it, by condensation of the surrounding cellular membrane, having very much of the appearance of a synovial membrane, and performing its office in facilitating the motions of the part.

Synovial System connected with the Tendons.—This entirely resembles

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resembles the preceding system in its nature, and differs from it only in situation: often indeed they are confounded together: thus those, which belong to the heads of the gastrocnemius, to the extensors of the knee and to the popliteus, are continuous with the joint of the knee, the same membrane belonging both to the articulation and to the tendon. Very few of these tendinous synovial membranes are found in the trunk, almost all of them occupy the limbs, in which they favour the motions of the tendons. They are found, 1, where a tendon turns over a bone at an angle, as at the passage of the peronei behind the outer ankle, and of the obturator internus over the ischium; 2, where a tendon glides against a bony surface without making any turn, as the tendo Achillis at the os calcis, the gluteus maximus at the great trochanter, &c.; 3, where a tendon plays in a fibrous sheath, as the flexors of the toes and fingers on the phalanges.

The synovial membranes of tendons, like those of the joints, form bags without any opening, expanded on one side over the tendons, and on the other over the organs with which the organs are in contact. From this disposition, and from the nature of the fluid with which they are lubricated, they have been called *burfæ mucosæ*, under which name they are generally described. It follows, that every tendinous synovial membrane must possess two surfaces, a smooth one, forming the interior of the bag, which is every where free and contiguous to itself, and an adherent one attached to the surrounding parts. The smooth surface is constantly moistened with a fluid of the same nature as the synovia of the joints, formed like it by exhalation, and not, as some have represented, by reddish fatty bodies placed on the outside of the membrane, which do not exist in general, and have no glandular texture when they do exist. This fluid in general is less abundant than in the joints; but the quantity varies in the different *burfæ*. It is sometimes increased in quantity, forming a species of dropsy, which is called a ganglion: this kind of tumour never exists in the fingers, because the fibrous sheaths which include the synovial membranes of their flexor tendons are unyielding. Often these ganglia are completely new formations, cysts developed in the cellular tissue.

The adherent surfaces of the membranes are fixed on one side to the tendons, to which they are closely attached, but not with equal firmness in all cases; it may be detached from the obturator internus, the psoas, &c., but in general it cannot be separated. On the other side it is fixed to the periosteum, which generally assumes the structure of fibro-cartilage. To this the membrane adheres as the articular synovial membranes do to the cartilages of their respective joints; that is, we cannot detach it, and shew it separately, but infer its existence from the polished surface of the part. Sometimes it is expanded over a fibrous capsule, instead of a bone. After covering the tendon, it is continued in some cases over a portion of the muscular fibres, as in the obturator internus. Where the membranes are reflected from the tendons to the surrounding organs, they are covered in general by a considerable quantity of cellular tissue: but in the case of tendons running in fibrous sheaths, they line those sheaths.

These membranes must obviously participate in the motions executed by the tendons, to which they belong: they will be drawn backwards and forwards as the tendon itself is moved.

The very various forms, which the bags of the tendinous synovial membranes present, may be reduced to two general modifications. The one kind are rounded bags, covering only one side of the respective tendons, having no internal

folds, and never surrounded by fibrous sheaths. The others, belonging particularly to the flexors of the toes and fingers, and to other tendons about the wrist and ankle, conhit in the first place of a cylindrical sac lining the canal, in which the tendon runs: it is then reflected over the tendon, which it covers on all sides, composing for it a complete sheath. This kind of membrane thus represents two cylindrical canals, one lining the bone and fibrous sheath, and the other covering the tendon, continuous with each other at the two ends, where the reflexion produces two cul-de-sacs. Folds are often seen in these, passing from one part of the membrane to the other: the synovial membranes of the digital flexors exhibit them.

Their organization is exactly analogous to that of the articular membranes. The structure is principally cellular, and distinguished by its softness: very few blood-vessels are seen, but the exhalants and absorbents prevail. The former become distended with blood under inflammation, and give to the membrane a more or less deep red tint. In this state synovia is not produced; and sometimes adhesions take place.

The vital properties, and those resulting from organization, seem not to differ from those of the preceding system. Like it, this is never affected sympathetically: all its diseases are local.

The obvious effect of these membranes is to facilitate the motions of the tendons over the bones and other parts in contact with them, by giving to the opposed surfaces a perfect polish, and lubricating them with a slippery fluid.

They are thin and delicate in the fetus and child, more dense and firm in the adult, and become rigid in old age: at the latter time they produce but little fluid, and are consequently dry. This state probably concurs with other causes in impairing the power of motion in the old subject.

Several of the *burfæ mucosæ* vary in different bodies. Sometimes this is only a mass of cellular tissue, in the place of that belonging to the gluteus maximus. These *burfæ* are always very dry when they exist, so that synovia can hardly be seen in them. They resemble, in that respect, the articular synovial membranes of the ribs, clavicles, &c.

Fibrous Membranes.—These comprehend the fasciæ of the limbs, &c., the periosteum and perichondrium, the dura mater, sclerotica, albuginea, the proper coverings of the kidneys, spleen, &c., the covering of the corpus cavernosum, &c.; all forming exterior investments of the organs to which they belong. These parts are not, like the stomach, intestines, lungs, bladder, &c., which are covered by serous membranes, subject to alternate enlargement and diminution: that would not suit the properties of fibrous organs. The membranes are moulded exactly to the form of the parts, and, with the exception of the dura mater, do not present the numerous folds seen in the serous membranes. Both their surfaces are adherent, in which they differ from the serous, mucous, and synovial membranes.

One of these surfaces, intimately connected to the organ, seems to send numerous processes into it. In the testes, corpus cavernosum penis, spleen, &c. are seen numerous fibres crossing in various directions, and attached to the fibrous membranes of these organs. On these, together with the membrane, the form of the part seems greatly to depend. Bony matter is thrown out in a rough and irregular form, when the periosteum no longer covers it: the figure of the testis is altered, when the albuginea is injured, &c. These fibres in the interior of the organs are not, however, of the same nature with the fibrous membranes: they cannot be deemed processes of those membranes. By boiling the corpus

pus cavernosum penis, or subjecting it to any other process, the interior spongy tissue and the outer fibrous covering always remain distinct in their appearance; there is no continuation of the one into the other.

The opposite surfaces of fibrous membranes are joined to the surrounding organs with various degrees of firmness, from the loose attachment of the corpus cavernosum to the close adhesion of the dura mater. In general, the fibrous membranes and other fibrous organs have a great tendency to adhere closely to the serous and mucous organs. The connection between the dura mater and arachnoid, the tunica albuginea and vaginalis, the fibrous capsules and the synovial membranes, shews this in the serous membranes. So intimate is the connection in these cases, that it is not possible to separate the parts by dissection in the adult. When fibrous and mucous surfaces meet together in an organ, they become completely confounded: this is seen in the pituitary membrane, in the membrane of the sinuses of the nose, in the ear, &c. In all these parts, the periosteum is not separable from the mucous surface. The vas deferens, the Fallopian tube, the ureter, seem to be fibro-mucous organs.

These membranes have, in general, a very close texture, and a remarkable thickness: they consist of a single layer. The dura mater seems to form an exception to this rule, by the folds which form the falx and the tentorium cerebelli; but we cannot point out two distinct layers in the membrane, except at the sinuses. They possess more vessels than all the other divisions of the fibrous system, and are perforated by numerous apertures for the passage of these vessels, which in general pass through them, in order to arrive at the organs which they cover. These openings, each of which is larger than the branch perforating it, distinguish the fibres from the serous membranes, which are always reflected, instead of being opened, for the purpose of admitting the vascular system into their respective organs. The description of the particular membranes will come under that of the organs to which they belong. We shall except the periosteum, which ought to be considered in a general way, both because it is a covering common to the whole bony system, and because it is a kind of connecting centre to all the organs of the fibrous system.

The *periosteum* surrounds all the bones in every part, except where they are covered by cartilage. It is hard, strong, of a greyish colour, remarkably thick in the early years of life, and proportionally thinner in the adult. The old anatomists conceived that it was prolonged from one bone to another, over the articulation, so as to constitute a continued bag for the whole skeleton. This is an incorrect notion. The periosteum is interlaced at the joints with the ligaments, which may thus be regarded as a medium of communication between the coverings of the different bones. It is in this way only that we can regard it as continuous over the whole skeleton. It does not exist in the crowns of the teeth, nor on the bony productions rising from the head in certain animals. It is feebly united to the bone in infancy, particularly at the middle of the long bones: the adhesion becomes strong in the adult; and is extremely firm in the old subject, in which the membrane is very thin. Numerous processes extend from this membrane into the bone: the number of these is much greater at the extremities of the long bones, and on the short bones, than at the middle of long, and over the surface of broad bones; all which we should have inferred, from observing the proportion of apertures in these situations. These prolongations accompany blood-vessels, and line the canals which penetrate the bones: they do not reach the medullary cavity, but are confined to the bony tissue, establishing relations between it and the

membrane from which they proceed. In consequence of this connection, the destruction of the periosteum is accompanied by the death of the corresponding part of the bone.

The relations of the periosteum to the surrounding organs are very various: in most cases the muscles lie on it, and are connected, according as they are capable of executing more or less considerable motions, by looser or closer cellular texture.

The direction of the fibres in this membrane is nearly analogous to that of the bones, particularly in the long and short ones; but it has not a radiated arrangement in the broad bones. They vary in length, and the superficial ones are the most extensive. Its vessels are derived from those of the neighbouring parts. Their ramifications form in the membrane a net-work, which injections shew very clearly, particularly in children: they are either lost in the membrane, or penetrate the tissue of the bone, or return into the neighbouring parts to form various anastomoses.

The periosteum receives the insertion of the tendons, ligaments, and aponeuroses. This attachment appears foreign to the bone in the child. If we detach the membrane, all these organs are brought away at the same time; but, as ossification extends to the internal plates of the periosteum, the fibrous organs seem identified with the bone in the adult.

In the fœtus it is soft, spongy, and containing much gelatinous fluid: it dissolves in water readily. Its fibres at this time are indistinct: they become more visible as age advances; the softness of the tissue is diminished, and its strength increased. The periosteum is extremely firm in the old subject: it resists ebullition almost as much as the ligaments. When the bones are boiled, it cracks in various parts, because its fibres are shortened and detached from the bone; but that which remains adherent is very difficultly converted into gelatine.

The functions of this membrane do not seem to be very satisfactorily ascertained. An opinion has been entertained that it serves to protect the bone from the pressure of the surrounding moveable organs, as the muscles and arteries. It has been supposed to be very much concerned in the formation of bone; but we cannot accede to this view of the matter. (See BONE.) It may form a kind of barrier, containing the progress of ossification within certain bounds. Bichat regards it as connected essentially with the functions of the fibrous organs attached to it. He considers that it is placed on the bony system, as a solid point of support, which enables it to bear the efforts of the various fibrous organs.

The *perichondrium* is a membrane surrounding the cartilages, except those belonging to the articulations, analogous in its structure and offices to the periosteum. It is thin and fibrous; less closely united to the organs, which it covers, than the periosteum, because they have fewer pores, and therefore receive fewer processes from the membrane: hence there is a less intimate connection between its life and that of the cartilage, than between that of the bone and the periosteum. Its blood-vessels are few. Bichat removed it from the thyroid cartilage of a dog, and no exfoliation followed.

For the vital properties of the fibrous membranes, the reader is referred to the article *FIBROUS SYSTEM*, where the subject is considered in a general point of view.

The compound Membranes.—The serous and fibrous membranes have a great tendency to adhere together, and exhibit this character wherever they are brought into opposition, as in the case of the arachnoid and dura mater, the tunica albuginea and vaginalis, the synovial membranes and fibrous capsules.

capsules of joints, &c. The two component parts of such membranes are so closely united, that it is impossible to separate them by dissection: however, they are clearly distinguished by their texture and properties.

The serous and mucous membranes are generally separated by a muscular stratum, as in the intestinal canal and bladder; and where they are not, as in the gall-bladder, the cellular substance belonging to the mucous is too copious to admit of the close adhesion necessary to form a compound membrane.

The fibrous and mucous membranes are in many cases consolidated together, as in the ureter, vas deferens, pituitary membrane, lining of the tympanum, &c. They are connected inseparably in these situations. In all, the mucous is the most important, as it is the seat of the functions of the part: the fibrous is accessory, and furnishes additional support and strength to the mucous.

There are several membranes, which do not come under the preceding classification: such are the fibrous coat of the arterial system (see HEART); the lining both of the arteries and veins (see HEART); that which lines the medullary canal of bones, and contains the marrow (see MEDULLARY System); the iris and choroid coat, and retina (see EYE); and the pia mater, see BRAIN.

MEMBRANE is a term also frequently applied in the English language to the cellular substance; *cellular membrane* therefore is exactly equivalent to the latter expression. A general account of this very important animal tissue is given under the head of *CELLULAR Substance*: we propose to consider it in a more extensive way in the present article, and particularly to exhibit the ingenious views of Bichat, as contained in the first volume of his "Anatomie Generale."

The cellular substance, surrounding the various organs of the body, forms at the same time a connecting medium which joins them together, and an intermediate structure which insulates them. It extends into the interior of the same organs, and is essentially concerned in their structure. We should regard it, first, in relation to the particular organs; and secondly, in a general manner, independently of other parts. In the first of these divisions we have to consider the cellular organ under two points of view: 1st, as composing & covering for each part; and 2dly, as forming one of the essential bases of its structure.

I. *Of the exterior Cellular Texture of each Organ.*—Some parts are covered on one surface only, as the skin, mucous and serous membranes, arteries, veins, and absorbents; while others are surrounded on all sides.

The corion of the skin contains, as we have shewn under the article INTEGUMENTS, a large quantity of cellular tissue, and anatomists have generally regarded it as formed by a condensation of this tissue. Besides this, a stratum of cellular substance, varying in quantity and density, lies under it in all parts of the body. At the median line the subcutaneous tissue is rather more dense than in other situations, and adheres more closely to the skin; this may be seen in the face, on the sternum of the linea alba, and over the spine. Bichat regards it as marking in an obscure way the symmetrical division which characterises the organs of the animal life; but we cannot insist much on it, as there are no traces in the neck. This author states that the air was confined to one side in some of his experiments on emphysema; but that it generally passed the line.

1. The subcutaneous tissue is remarkably dense under the scalp; it is loose and abundant in the face. By its laxity in the trunk it favours the motions of the large muscles in that situation. It is distributed almost uniformly in the limbs, except that it is dense in the palms and soles, where

consequently the skin is more closely united to the aponeuroses, and anasarous depositions are formed with difficulty. It is also more dense and close over the annular ligaments; and hence the constrictions which the limbs of children present in these situations, as the fat does not penetrate easily into cells so closely approximated.

The subcutaneous cellular tissue bestows on the skin its power of motion with respect to the organs that it covers; this is exemplified in the movements of the trunk and limbs, in the effects of external bodies brought in contact with the surface, in the cutaneous coverings acquired by large tumours, as hernia, farcocele, &c. at the expense of the surrounding parts. From the same cause arises the facility of motion in organs situated under the skin, as the muscles.

It contains a larger proportion of serous fluid than other parts of the cellular substance, and is more liable to preternatural accumulations of that fluid, probably on account of its greater laxity. If the skin and subjacent tissue be stripped from an anasarous lower extremity, it will appear very little larger than a healthy limb treated in the same way.

2. The mucous membranes have the same relations to the cellular substance as the skin, of which they are continuations, and to which their structure bears considerable analogy: the structure occupying their surface is called by Bichat *tissu solumneux*. It is much more compact and dense than the former, and the adhesion of the mucous system to the surrounding parts is consequently much more close. Hence it is difficult to separate the mucous membranes perfectly, and impossible to produce emphysema under them artificially. Air is never seen in this tissue in the most extensive natural emphysema, nor is water ever deposited in it in the most general anasarca. Indeed the hollow organs would have their functions destroyed by the obliteration of their canals, if the submucous were liable to the same distention as the subcutaneous tissue. This firmness in the former tissue enables it to serve as a point of attachment to the muscular fibres, which belongs to the stomach, intestines, bladder, &c.

3. The adherent surfaces of serous membranes are covered by cellular tissue, called by Bichat *tissu sousecreux*, which is in general loose and abundant. In some parts, however, the union is so close that no cellular substance can be discerned; as in the tunica vaginalis and albuginea, the arachnoid and dura mater, &c.: these constitute sero-fibrous membranes.

4. Arteries and veins are connected to the surrounding organs by a loose and easily lacerable cellular substance. (See the account of their structure in the article HEART.) The absorbing vessels are probably furnished with a corresponding covering; but their minuteness prevents us from ascertaining this point by direct investigation.

5. The various excretory tubes are surrounded by cellular tissue. All these have a mucous lining, which is covered by a dense and firm stratum of matter, differing in the different tubes, and the exact nature of which is probably not yet well understood. It seems doubtful whether we ought to assign this exterior covering to the cellular tissue. See GLAND

The organs of the body, except those which have been just mentioned, are surrounded on all sides by a more or less abundant cellular stratum, which insulates them, and interrupts those communications which would connect the vitality of one part to that of another in too intimate a manner, if their juxtaposition were immediate. The serous vapour and fat of the cells probably contribute to this insulation of vitality; but the essential difference, between the proper life of the cellular substance, and that of the organs which it incloses, renders that tissue very capable of fulfilling this

office, independently of the fluids which it contains. The confinement of diseases to particular organs is ascribed by Bichat to this insulation of their vitality. We meet every day with diseased organs covered by healthy serous membranes, with catarrhal mucous membranes surrounded by sound parts: the numerous cutaneous eruptions do not affect the subjacent organs, &c. On the other hand, diseases are very often communicated from one part to another. A phlegmonous inflammation involves all the surrounding parts: the rheumatic affection of a joint produces exterior swelling, and disease of the ligaments of the knee is accompanied by an analogous phenomenon. Nor are diseases alone communicated from one part to another: the effects of remedies often act in the same way, as for instance, blisters and poultices. If the cellular substance has any influence on these changes, how are we to account for results apparently so contradictory under similar circumstances? Will it not be more philosophical to confess that we are ignorant of the causes, by which the communication of diseases is influenced and modified, than to adopt, in the absence of all direct proof, a mode of explanation which so frequently fails? When Bichat tells us, in cases where disease is confined to one organ, that the cellular atmosphere, by possessing a different kind of vitality, prevents its propagation; and, in opposite instances, that this atmosphere becomes charged with emanations raised from the morbid part, or that its vital powers experience a change analogous to that which has affected the diseased organ, does this apparatus of words impart to us any farther knowledge than that of the simple fact, that morbid changes sometimes are, and sometimes are not, propagated from one organ to another?

The quantity of cellular tissue surrounding any organ bears a relation to the motions which it is capable of executing; and is more abundant in proportion as these motions are more extensive. Hence it is seen in considerable quantity about the large arterial trunks, the eye, the uterus, bladder, the large joints, as the hip and shoulder. By the extension and contraction of its cells it is very capable of accommodating the motions of the organs, particularly their dilatation and contraction. Parts, which enjoy extensive power of motion, and yet have but little cellular tissue on their surface, as the viscera, and the articular ends of bones, are surrounded by serous or synovial membranes. In many instances organs with very little motion are covered by an abundance of cellular tissue: the kidney, testis, thyroid gland, and pancreas are examples.

11. *The internal Cellular System of the Organs.*—After surrounding all parts, this system enters into their substance, and forms one of its principal elements. In those apparatuses, which are an assemblage of several systems, each is united to the surrounding ones by it; as the different coats of the stomach, intestines, bladder, &c. Again, it enters largely into the composition of the organic systems: it surrounds their vascular and nervous ramifications, and unites the various homogeneous parts that compose them. Thus, says Bichat, each portion of an organ has a covering, performing the same office with respect to it, that the general covering does to the whole organ; it forms an atmosphere, limiting and protecting the vitality of each fibre, or serving, (more readily on account of the greater juxtaposition) as a means of communication from one to the other.

This interior cellular tissue is only a means of union, and preserves all its own properties; it is insensible in the nerve, incapable of contraction in the muscle, and unconnected with secretion in the glands. It is often affected alone in an organ; hence the numerous tumours in the liver, which have the glandular tissue perfectly healthy.

The texture of many organs is so close that the cellular tissue is but little apparent, and its very existence has been denied. In tendons and fibrous membranes maceration renders it discernible: ebullition has a similar effect, by dissolving the gelatine which a part may contain. In all instances, even in bones and cartilages, the production of granulations, which are essentially of a cellular nature, demonstrates the existence of this tissue. The conversion of bones into a soft and fleshy state, and the production of fungous tumours in other systems, by rendering the tissue more loose, demonstrate the cellular substances.

Of the Cellular System considered independently of the Organs.—In the interior of the cranium this tissue seems to be almost deficient. Yet the pia mater is formed by it; and a small quantity of a very fine and perfectly transparent kind is seen where the nerves quit the surface of the brain. There is no possibility of demonstrating cellular tissue in the substance of the brain, unless perhaps by its fungous tumours. Through the optic foramina and the superior orbital fissures, the cellular substance of the cranium communicates with that of the orbit; through the holes of the cribriform plate with that of the nose; through the various apertures of the basis crani, and the numerous but minute pores about the sutures, with the corresponding external parts. It is more abundant, but still in comparatively small quantity, on the outside of the cranium, and communicates evidently with that of the face, particularly in front.

It is very abundant in all parts of the face: the orbits are filled with it; the hollows of the cheeks, bounded by the buccinator, masseter, and zygomatic muscles, contain it in large quantity, as well as all the parts about the tongue. The nose and its sinuses have a very small proportion. On its existence in greater or smaller quantity, the appearance of the countenance, with respect to fulness or sharpness, depends. The expression is regulated by the muscles. It communicates with that of the neck by its subcutaneous portion, by what accompanies the vessels, particularly in the triangular space lodging the parotid, and by the intervals of the muscles about the root of the tongue.

Very little is found in the vertebral canal, between the arachnoid and the medulla spinalis and its nerves: there is none between the arachnoid and dura mater. It is more copious on the outside of the latter, particularly towards the lower parts, where it is very loose. On the outside of the spine the muscles are very numerous and closely arranged, and the cellular tissue very sparing behind; it is copious on the front. It accompanies the carotids on the neck, the aorta and its large branches, the azygos, and the vena cava in the chest and neck. This disposition is very favourable to the formation and extension of depositions of pus.

The neck is a very muscular part, and contains much cellular tissue, besides what belongs to the spine, particularly on its sides, where the lymphatic glands are found. In this situation it communicates with that of the chest, by the superior opening of the latter cavity. It also communicates with the upper limbs above and below the clavicles.

The largest quantity of cellular tissue occupies the middle line of the chest: there is much of it in the mediastinum, about the pericardium, and the large vessels. In the parts occupied by the lungs, the quantity is considerably less. The communications between it and the abdominal cellular tissue take place, 1st, at the various openings of the diaphragm, particularly those which transmit the aorta and œsophagus, for the vena cava is too closely united to its opening to allow of such communication: 2^{dly}, through the intervals of the diaphragmatic fibres, particularly at the triangular space left between those attached to the xiphoid cartilage.

cartilage. There are communications from within outwards at the intervals of the intercostal muscles; but these are very trifling, and consequently the internal affections seldom have any influence on the external parts.

On the outside of the chest, the cellular tissue is abundant above; it encloses the mammary glands, and produces the elegantly rounded forms which charm us in the female; it contributes to the bold prominence which is the attribute and character of male strength. There is much of it under the pectoral muscles, but the quantity decreases very sensibly downwards.

The abdomen contains more cellular tissue than the chest. It is accumulated in large quantity about the large arterial and venous trunks, and accompanies them to their respective organs. It is also very abundant along the back of the peritoneum, particularly about the kidney, but much more sparing on the front and sides of the abdominal parietes. It communicates with that of the pelvis all round the peritoneum, and with that of the lower limbs at the inguinal canal, and more particularly at the crural arch. In the latter situation, the pus generally descends in lumbar abscesses.

The outside of the abdomen has the usual subcutaneous stratum, which is continuous with that of the pelvis and lower limbs. Between the abdominal muscles there is a moderate quantity. The outer and inner portions of cellular substance communicate through the muscles, particularly at the posterior and lateral regions: the fluid of lumbar abscesses sometimes takes this direction and presents in the loins.

Few parts have a more abundant distribution of cellular tissue than the pelvis; it is placed very copiously round the bladder, rectum, and uterus. The great dilatations of which the organs are susceptible, and the unyielding nature of the parietes of the pelvis, explain this arrangement. The nature of the abscesses, which occur about the anus, and the diffusion of urine from ruptures of the urethra, are modified by this structure. It communicates with that of the lower limbs by the ischiatic notch, the foramen ovale, and the arch of the pubes. The outside of the pelvis has also much cellular substance: it is most copious in front, about the generative organs, particularly in the labia and scrotum, and more abundant on the sides than behind.

Both in the upper and lower limbs the quantity of cellular tissue constantly decreases from above downwards. It is very considerable round the upper articulation of each: the hollow of the axilla is almost entirely filled with it; the bend of the thigh does not contain so much. There are large cellular intervals between the muscles of the arm and thigh. The elbow has much less than the ham, the deep hollow of which holds a large quantity. In the fore-arm and leg the muscles are more approximated, and the cellular strata consequently thinner. Towards the lower part of these two divisions of the limbs, it is still more diminished in quantity. Yet the sole contains much more than the palm. The difference in the extent of motion in the different parts of the limbs corresponds to this arrangement.

Concerning the general forms of the cellular tissue, the figure and permeability of the cells, and the serous fluid which lubricates them, we refer to the article *CELLULAR Substance*. We have only to remark here, that the capacity of the cells is extremely various. When distended with fat or serum, they are two, three, or four times as large as in the empty state. These variations in capacity produce the differences in the volume of the body in the states of embonpoint or emaciation, in which all the other parts, as nervous, tendinous, and muscular fibres; &c. remain unchanged, and the cellular tissue alone is altered.

When the cellular substance of a living animal, or of one recently killed, is exposed to cold air, a vapour arises from it, as it does from serous surfaces. This moisture seems just sufficient, in the natural state, to maintain the cells soft and pliant.

To the general observations on the fat, in the article *CELLULAR Substance*, we have a few remarks to add. Its proportion varies in the different organic systems. The arterial and venous tunics, the lymphatic glands, the brain and spinal marrow, contain none. There is always some in the intervals of the nervous fibres, as may be proved by drying them. Generally the muscular fibres of the animal life contain a tolerably large proportion; but those of the organic very little. Its place is supplied in the bones by the medullary structure. The cartilaginous, fibrous, and fibro-cartilaginous systems, are almost entirely destitute of it. Sometimes it is observable in the glandular system, as in the parotids, and about the pelvis of the kidney; but in other parts, as the liver, prostate, &c. no trace is discernible. The serous and cutaneous systems are surrounded by much fat, but contain none in their tissue: the same observation is true of the mucous also. The epidermis and hair have none. Thus we see that the organic systems in general contain very little fat: the organs themselves have but a small quantity between their different parts. In general there is hardly any between the coats of the stomach, intestines, bladder, &c.; between the periosteum and bone; the bone and cartilage, &c. It is accumulated principally in the intervals of the organs. In this point of view the cranium and face exhibit opposite arrangements; it is abundant in the latter, and deficient in the former, particularly on the inside. There is a tolerable quantity in the neck. Very little exists about the lungs, but much round the heart: and there is a large deposition on the outside about the breasts. In the abdomen, it lies principally behind, in the neighbourhood of the kidney, in the mesentery and epiploon: there is much in the pelvis about the bladder and rectum. It follows the same arrangement in the limbs as the cellular tissue, being more abundant at the upper parts, and about the large articulations, than in other situations.

All the fat in the child is concentrated under the skin: the omentum, and indeed the rest of the abdomen, contains none, except perhaps a few flocculi about the kidney. The chest contains hardly any more, and the intermuscular tissue is almost every where free from it. In the adult, the abdominal fat exceeds the proportion of the subcutaneous: the rounded contours, by which all the muscular forms are concealed in the early years, are rare at the latter period. These observations, however, concerning the proportions of fat, as connected with different ages, admit of frequent exceptions.

The fat is sometimes accumulated in an unnatural quantity: it constitutes in such cases a real disease. (See *CORPULENCE*.) The opposite circumstances to these, which produce this unnatural load of fat, cause emaciation.

The fat is almost always firm in the dead body, but it approaches more nearly to the liquid state during life: its condition, however, is not uniform in all parts, the subcutaneous being the most solid, and that of the omenta most fluid. It is not so fluid in the living body as exposure to heat renders it after death: its consistence indeed must depend on other causes than temperature, as it varies so much in different parts of the body under the same heat. It is whitish and very firm after death in young animals: hence there is a striking contrast between the solid feel of the skin in a young subject, and the yielding sensation which it offers in the adult. It is collected into small and more or less rounded granules

granules in the fetus; a remarkable and almost insulated globular portion, which can easily be drawn out entire, occupies the hollow between the masseter and buccinator muscles. It turns yellow as age advances, and acquires a different odour and taste: every one must have noticed the difference between that of veal and beef, and the distinction is not less strongly marked between that of a young and old person.

A yellowish, transparent, and semitranslucent substance, with a gelatinous aspect, is found about the hearts of those who have died from dropsy, phthisis, or other tedious debilitating diseases, and occupies the place of fat. It is also seen in other situations, but less frequently; and seems rather gelatinous than oily.

We have nothing to add to the remarks in the article *Cellular Substance*, concerning the mode in which the fat is formed; and we refer the reader to *FAT* for the history of its chemical properties.

Organization of the Cellular Substance.—The proper tissue, which composes the basis of this system, consists of a transparent web, disposed in plates of an uniform appearance, and so thin that they may be compared to soap bubbles; and of whitish filaments crossing these in various directions, and forming with them cells. This structure may be seen by taking a portion of the cellular matter of the serotum, extending it and observing it against the light. The filaments are approximated, and seem to touch each other when the part is left to itself; when it is distended, the intervals left between them are larger, and the intermediate laminae more distinct. Bichat conceives that the filaments are absorbents or exhalants, or made up by the union of the laminae, where they form cells. The plates are tolerably dense when the cellular tissue is contracted; when air is forcibly impelled among them, they are reduced into a kind of thin froth, in which we could hardly suppose that vital properties could reside.

In all parts where fat or serum is deposited, we see true cells, communicating together; and the great accumulations of such fluids are deposited in these cells. But the submucous tissue, and that which composes the outer coverings of arteries, veins, and excretory tubes, seems to be composed entirely of condensed and approximated fibres, without any plates, and consequently without any cells.

Composition of the Cellular Tissue.—Chemists have placed it in the class of white organs, or such as furnish a large quantity of gelatine. Solution of tan causes a considerable precipitate from water, in which it has boiled. Yet the effect of various agents on it is very different from what they produce on the fibrous, cutaneous, cartilaginous tissues, &c.

It is quickly dried in the air, but without assuming the yellow tint of the fibrous tissue; when plates of it are dried, it exactly resembles a serous membrane treated in the same manner. In this state it is perfectly flexible; it recovers its original appearance only in part, when immersed in water.

It yields to putrefaction less readily than most other tissues, than the glandular and muscular organs for example. This property is particularly observable in the submucous tissue, and in that which forms the outer covering of arteries and veins. The same observation may be made concerning maceration: the exterior tissue of arteries is hardly changed in three months; the subcutaneous, the intermuscular, and other parts of the system, yield more quickly. It resists longer when exposed alone, than in conjunction with parts which decay quickly; and this resistance is the more remarkable, since the nature of the tissue renders it

accessible to the action of water at all points. The latter circumstance must also render it more subject to the influence of ebullition; yet it does not yield quickly, and the exterior tissue of arteries, excretory tubes, &c. resists for a long time. The phenomena produced by boiling are analogous to those observed in other organs treated in the same way. It is not changed until a froth rises to the surface; it is then reduced in size, rendered firmer and elastic, and is curled up. After a certain time, as the boiling is continued, it becomes soft again, and is broken by the slightest force. The continued action of boiling water gradually melts it.

The gastric juice acts on it less quickly than on the muscular fibres.

Thus the cellular tissue seems to combine two opposite characters, softness and pliancy; by which it facilitates the motion of organs; and considerable resistance to the operation of various agents.

This tissue is distended with air in the bodies of the drowned, so that they float: probably the air is disengaged from organs containing a great deal of blood, as the muscles, glands, &c., and not from the cellular tissue. A similar phenomenon is observed in bodies buried under the earth, out of the contact of air; but it does not often take place in those left in the open air.

The blood-vessels of the cellular tissue are not numerous in the natural state. It is whitish, when observed in a living animal: large trunks pass through it to the neighbouring parts, and send off branches, which are lost in the tissue. After some exposure the number of these vessels is increased, as the red blood gains admission into the exhalants.

Successful minute injections have a similar effect in the dead body; they make it appear like a vascular network.

The exhalants are proved by the production of apparently new vessels where the part is exposed during life, and by the effect of injections; by the natural and the morbid depositions of serum and fat into the cells, &c. These vessels are very numerous in the present system: they are subservient to its nutrition, and to the habitual exhalation, of which it is the seat.

Absorbents cannot be shewn by actual inspection, nor by injection; but their existence is proved by phenomena: 1, by the natural and constant absorption of the serum and fat; 2, by the removal of unnatural accumulations of either of these fluids; 3, by the absorption of air in emphysema, or of fluids injected into the cells, &c. This system, indeed, seems to be a principal source of the absorbing vessels, at least of such as convey lymph. Some have considered it as formed exclusively of exhalants and lymphatics. Each cell is a reservoir, placed between the exhalants which terminate in it, and the absorbents which arise from it; we see the mouths of neither of these vessels: the cells are on a small scale what the serous cavities are on a larger.

Many nerves are seen going through the cellular tissue; but we do not know that any filaments terminate in it.

Properties of the Cellular System.

1. *Properties resulting from Organization.*—The extensibility of tissue is seen on a variety of occasions: all the motions of the body call it into exercise; the arm cannot be elevated without the cellular substance of the axilla being drawn out to twice or thrice its natural length, and the motions of the neck, the thigh, and indeed all other parts, present analogous phenomena in different degrees. Whenever any organ is drawn away from a contiguous one, the connecting tissue must be lengthened. In the distentions of the hollow viscera there is a similar

proccs. In the accumulations of serum or fat, of which this tissue is so frequently the seat, in the formation of tumours of all kinds, in the distentions of the abdomen or other cavities, the exercise of this property is clearly observed, and indeed is absolutely necessary to the production of the phenomena.

The different divisions of the system possess this property in very different degrees. The subcutaneous, the intermuscular, and that which covers serous membranes, enjoy it to a much greater extent than that which surrounds arteries, veins, and excretory tubes: from its indisposition to yield in the latter case arises the slow growth of aneurisms. Wherever laminae, and consequently cells are found, the extensibility can be brought suddenly into action: thus emphysema distends the whole body to an enormous degree in a very short time, and fractures and contusions are followed by very rapid and considerable tumefaction.

When the distending force is carried beyond a certain point, the tissue is first rendered very thin, and then broken. No natural motion can be carried to an extent sufficient to produce this effect; the tissue of the axilla may be distended three times as much as it is in the elevation of the arm, without any rupture. And this effect is still further prevented by the kind of locomotion which it admits; when forcibly drawn in any direction, it drags the neighbouring tissue, and thus can change its situation in some degree. Thus, in large swellings of the scrotum, the cellular substance of the abdomen, perineum, and thighs, is brought over the part.

Inflammation entirely destroys this property. In the induration accompanying cancerous affections the cellular tissue is actually rendered very brittle.

The contractility of tissue is observed, when the causes of extension cease to operate; as when a limb, after being extended, is restored to its former position, when fat, serum, or tumours are removed from the cellular substance, &c. If a wound be carried through the skin and cellular membrane, the edges are separated to a certain degree. This power exists in its greatest energy in youth, and is gradually weakened as old age advances. When a young man is emaciated, the skin is adapted closely to the organs, and preserves its tension: in an old person, on the contrary, the integuments are loose and flabby, because the subjacent tissue does not contract.

2. *Vital Properties.*—This tissue, in its ordinary state, does not possess animal sensibility; it may be cut, torn, or distended with gases without causing any pain, unless the nervous filaments passing through it should be accidentally irritated. In disease, on the contrary, the sensibility may be exalted to such a pitch, as to produce the most acute pain; for example, in phlegmonous inflammation.

The organic properties are very strongly marked in this system. The deposition and absorption of the fat and serum are performed under their influence. All substances are not in the same relation to the absorbing power. Blood, lymph, and milk, when introduced into the cellular substance, are taken up like the serum or fat. On the contrary, urine, bile, saliva, and other fluids designed to be expelled from the body, produce inflammation, and are not absorbed. Water and air artificially introduced are removed by the absorbents. Wine and other irritating fluids excite inflammation, and are expelled with the pus formed in consequence.

The cellular organ enjoys sensible organic contractility to a certain degree: this is evidenced in the corrugation of the scrotum from cold. It seems to be the first obscure rudiment of that power, which in a higher degree belongs to the muscular fibres.

The sympathies of the cellular with other systems are

very numerous, but cannot easily be appreciated, on account of its being so widely disseminated, and concurring in the structure of all the organs. In acute affections of a part, as the lungs, stomach, &c. abscesses often take place, and the critical suppurations seem to be a sympathetic phenomenon. Edema often comes on suddenly in acute diseases. But the influence of the principal viscera on the cellular tissue is particularly shewn in the alterations of their structure consequent on chronic disease. The slow affections of the heart and lungs, of the liver, stomach, spleen, uterus, &c. are attended in their latter stages by a more or less general anasarca. It seems now to be pretty generally agreed on, that the effusion in all these cases is symptomatic, and results from the influence of the affected organ on the cellular tissue. The very various conditions of the cellular substance in the dead subject, may be probably referred to the effect of the particular disease which has proved fatal.

It also acts upon other parts, when it is originally affected. Phlegmonous abscesses, when large, produce various affections of the brain, heart, liver, stomach, &c.

It is clear, from the preceding observations, that the vital forces exist in a very marked degree in the cellular system; in this respect it is very different from the white organs, such as the aponeuroses, tendons, cartilages, ligaments, &c. among which it has been ranked, and which are remarkable for the obscurity of their vital powers, and the slowness of their functions. Inflammation passes through its course with great rapidity in this system, and the fluid, which results from it, forms in its colour, consistence, and other properties, the standard by which we judge all kinds of pus. Yet that which comes from a bone, a muscle, a mucous membrane, &c. is equally good and laudable pus, as what is formed in a phlegmon.

Does the cellular tissue assume any peculiar vital modifications in the organs, of which it enters into the composition? This is not known.

However, these observations apply to it only in the intervals of parts, abstractedly from all combination of its structure with them.

We must not pass unnoticed the very marked difference between the generally diffused tissue made up of laminae and filaments, and that modification, consisting only of the filamentous part, which surrounds mucous surfaces, blood-vessels, and excretory tubes: the latter is very seldom the seat of inflammation or tumours. It very often places a boundary to the affections of the former, and thus protects the organ which it includes. The tissue surrounding the axillary or inguinal artery is often generally inflamed or ulcerated, and the vessel remains unaffected, &c.

The cellular tissue is distinguished from all others, by its reproductive properties, by its power of becoming elongated and growing, of forming what are called granulations, when it has been cut or divided in any way. Hence are explained the formation of cicatrices, tumours, cysts, &c. The reparation of injury, therefore, is chiefly confided to this tissue; and it goes on nearly alike in all parts, as all contain cellular substance: parts which have none of this never granulate.

Bichat states, that the granulations are small cellular vesicles, filled with a thick fatty (lardacée) substance, and not admitting distention by inflation of the surrounding tissue. They are developed separately and irregularly over the wound, unite at their bases, and thus form a kind of provisional membrane, which completely protects the subjacent parts from the contact of air, until the completion of cicatrization. The surface of this is tuberculated, and it differs in that respect only from a serous membrane. This explanation

nation of the process of cicatrification is confirmed by various considerations. Granulations are formed most readily, and wounds are healed most quickly, where the system is the most abundant; cicatrification proceeds slowly where the cellular tissue has been extensively removed. Maceration reduces all granulating surfaces to this common basis. The nature of granulations is every where the same, whatever organ, whether muscle, cartilage, skin, bone, ligament, &c. may have produced them. They null, therefore, be produced from a tissue common to all organs, and this is the cellular substance.

The red aspect of granulations has led to the opinion, that they are a vascular expansion; but the appearance admits of an easier solution. The cellular membrane is crowded with exhalant and absorbent vessels, into which the red blood passes under inflammation. As the granulations are cellular, and in a state of inflammation, they exhibit the redness of phlegmon or erysipelas, which depends, not upon the elongation of vessels, but simply on the transmission of red blood through those which ordinarily carry white. Thus, when the inflammation is passed, the membrane resumes its natural colour; and granulations, after the cicatrix is formed, are colourless, because the coloured blood has ceased to permeate them. How can we suppose red vessels to be generated in structures where they have no primitive existence? for tendons and cartilages granulate.

The process of nature is completely analogous in repairing the injuries of internal organs, as bones, cartilages, muscles, &c., where there is no exterior wound. The ends of a broken bone become inflamed, and covered with a cellular production. These granulations form a secretory or rather an exhalant organ, and first separate gelatine, which gives to the callus a cartilaginous nature, and afterwards calcareous phosphat, by which the bone is completed. In other organs the granulations separate in a similar way the peculiar nutritive matter of the organ; and the process does not seem to be at all different from that of ordinary nutrition. The granulations of an external wound exhale pus, which is excreted.

As suppuration proceeds, the white substance in the cells of the granulations is removed, the cells are contracted, the tubercular elevations disappear, and are replaced by a thin and smooth surface. It is thin, because the thickness of the granulations depended on the contents of the cells, which are now empty; and it is much less extensive than the original pellicle, because the contraction of the cells draws together in every direction the edges of the divided part. Thus the granular productions, which seemed to be so abundantly developed as amply to repair the loss of substance in the part, are reduced to a thin stratum constituting the cicatrix, of a reddish colour so long as the exhalants are full of blood, and afterwards whitish.

Fungous excrescences from wounds, and exuberant granulations of all kinds, are overgrowths of the cellular substance, exceeding the ordinary laws of cicatrification, which cannot be completed so long as they continue. The development of the cellular system is remarkably exhibited in tumours. The funguses of mucous membranes, as in the antrum, the mouth and uterus, polypi, and cancers, are all the produce of cellular tissue: that system forms their basis, on which a peculiar matter is deposited. It constitutes in short the general basis, or nutritive parenchyma, of all tumours; the formation of which exhibits phenomena exactly analogous to those of ordinary nutrition. All the organs of the body have the same parenchyma of nutrition, which is vascular and cellular; they differ in the nutritive matters deposited in it. In the same way all tumours are cellular, and their

distinctness are drawn from the matters deposited by that tissue, which differ according to the different modifications of its vital powers, produced by its peculiar alterations, of which it is the basis.

Cells have their origin in the cellular substance. Of this we have a proof in the striking similarity which they bear to serous membranes, which are essentially cellular. This analogy prevails throughout their construction, structure, vital properties, functions, and diseases.

Development of the Cellular Tissue—In the early periods of conception the fetus is a soft mucous mass, apparently homogeneous, in which the cellular tissue seems to prevail almost exclusively. Almost entirely fluid at first, it afterwards has the consistence of jelly, and then cellular substance is visible. The abundance of fluid is the cause of its peculiar appearance in the early periods: this fluid is viscous and unctuous, and prevents us from producing artificial emptyness. Nothing can exceed the delicacy of the plates and filaments which compose the cellular texture at this time.

Some time before birth, and during the years that follow it, the cellular fluid is constantly decreasing; the cells become more apparent, and the mass of the system diminished, because as the organs grow, their intervals are rendered narrower. Yet it predominates over the other systems for a long time; hence the roundness of form, the multiplicity and facility of movements in the child. The tissue is still extremely fine.

The vital powers of the system are strongly marked at this age; granulations are produced more readily, and pass through their periods more rapidly than at any other time; wounds are healed more quickly, and tumours are developed, and grow in a much shorter time; serous fluid is quickly removed from the cells.

The cellular tissue assumes a more dense and strong form in the adult, and is in smaller quantity in proportion to the organs; hence the prominences of the latter under the integuments, the energy of muscular forms, &c. Its quantity seems to vary in the different temperaments; and to be greater in the female than in the male.

It becomes still more compact and hard in the old subject; and contains less fluid; hence the dryness and rigidity of parts in old age, and the general diminution of bulk in the body. Its vital powers are diminished, and it no longer maintains the skin close upon the subjacent parts, but allows it to become folded. Bichat, *Traité des Membranes*; and his *Anatomie Générale*, tom. i.

MEMBRANE, *Nictitating*. See NICTITATING, and the preceding article.

MEMBRANES, in *Midwifery* and *Anatomy*, the coverings which surround the fetus while it is contained in the uterus; they are three in number, the decidua, chorion, and amnios. See EMBRYO.

MEME. *Que est Mem.* See QUE.

MEMECYLON, in *Botany*, a name adopted from Dioscorides, whose *μμεκκίλα* is a synonym for the fruit of the *Arbutus* or Strawberry-tree, his *κωμάρης*; and seems to be derived from *μωω*, to desire, or long for, in allusion to the tempting appearance of those berries. The Latin name of the same fruit, *unedo*, carries the idea a step further, implying that nobody would be tempted to eat more than one, because the flavour is by no means answerable to the appearance. Linnæus in his *Flora Zeylanica*, 57, first applied this name to the genus which now retains it, and which is of a shrubby and berry-bearing nature, but does not appear to have any other pretensions to this denomination. Mitchell chose it, with rather more propriety, but too late, for a small American plant, allied to *Arbutus*, which, as *Memecylon* was already pre-occupied, Linnæus called *EPIGEA*; see

MEMECYLON.

that article.—Linn. Gen. 191. Schreb. 258. Willd. Sp. Pl. v. 2. 347. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 355. Juss. 321. Lamarck Dict. v. 4. 88. Illustr. t. 284. Gærtn. t. 127 and t. 179.—Class and order, *Oëandria Monogynia*. Nat. Ord. *Onagrea*, Juss. or rather *Myrti*.

Gen. Ch. *Cal.* Perianth superior, of one leaf, undivided, bell-shaped, turbinate, entire, or obsoletely four-toothed, permanent; cup-like and sometimes furrowed within. *Cor.* Petals four, ovate, acute, equal, spreading, inserted into the rim of the calyx. *Stam.* Filaments eight, erect, awl-shaped, dilated and abrupt at the top; anthers simple, of two distinct lobes, attached to the edges of the dilated top of the filament. *Pist.* Germen inferior, turbinate, containing the rudiments of many seeds; style awl-shaped; stigma simple. *Peric.* Berry globose, crowned with the cylindrical calyx, of one cell. *Seeds* one, two or three, convex.

Eff. Ch. Calyx superior, turbinate, nearly entire. Petals four. Anthers on the edge of the dilated summit of the filaments. Berry crowned with the cylindrical calyx.

Obf. The corolla is said to be monopetalous in Willdenow and Hort. Kew. which is an error of the press in Linn. Syst. Veg. ed. 10, 12, 13 and 14, contradicting the character of four petals, rightly given at the head of the class.

1. *M. capitellatum*. Ceylon Memecylon. Linn. Sp. Pl. 497. Lamarck. fig. 1. (*M. foliis ovatis*; Linn. Zeyl. 57. *Cornus sylvestris*, foliis croceum colorem tingentibus, flosculis ad foliorum alas globosis; Burm. Zeyl. 76. t. 30. Walikaha; Herm. Mus. Zeyl. 4. Kasjavo-maram; Rheede Hort. Mal. v. 5. 37. t. 19.)—Leaves elliptic-ovate, obtuse, on short stalks. Umbels axillary, somewhat compound, on slender stalks, longer than those of the leaves.—Native of Ceylon, Malabar and the island of Mauritius. It is a moderate-sized tree, with many opposite branches, knotty or tumid under each subdivision. Every part is perfectly destitute of pubescence, which, as far as we can discover, is the case with the whole genus. *Leaves* on short thick *footstalks*, opposite, ovate, somewhat elliptical, and often roundish, blunt and generally emarginate, entire, as in the whole genus, about an inch long or more, and half as broad, coriaceous, single-ribbed, without veins; their upper side dark green and shining; under paler, yellow and opaque. *Umbels* axillary, more or less compound, their common stalk slender, obscurely quadrangular, its subdivisions partly racemose, but always more or less umbellate. *Flowers* green with a purple tinge in the petals. *Tops of the filaments* very broad. *Calyx* very slightly four-cleft, obtuse. *Style* thick, but twice the length of the calyx.

This is said by Hermann to supply the place of Saffron, in Ceylon, for dyeing. Linnæus confounded so many species under this one, at different times, that it is hard to say exactly which he really meant. Our's is the plant of Burmann, and of the generality of botanists, though not of the Linnæan herbarium. But in the present case the latter is of no authority, the specimen having been acquired after the publication of the *Species Plantarum*, and not even marked with any trivial name.

2. *M. ramiflorum*. Naked-flowering Memecylon. Lamarck Dict. v. 4. 88. (*M. tinctorium*; Willd. Sp. Pl. v. 2. 347. Koern. MSS. *Cornus zeylanica sylvestris altera*, korakaba dicta; Burm. Zeyl. 76. t. 31. Korakaha; Herm. Mus. Zeyl. 40.)—Leaves elliptical, obtuse, on shortish stalks, deciduous. Umbels from the defoliated part of the branches, aggregate, compound, stalked. Style capillary, four times as long as the petals.—Native of Ceylon, and other parts of the East Indies. Very like the last, except that the *leaves* are rather more oblong, *flowers* much more

copious, from the leafless part of the branches, and essentially distinguished by the great length, and slenderness, of their *style*. We cannot comply with Willdenow's change of Lamarck's most excellent name, for an unpublished one of Koenig's, which is at least as suitable to the first species, if not to every other. We have no doubt of Burmann's synonymy, though he describes but four stamens; as he commits the same error respecting the foregoing.

3. *M. ovatum*. Ovate Memecylon.—Leaves ovate, bluntly pointed, veiny, on longish stalks, deciduous. Umbels from the defoliated part of the branches, aggregate, stalked. Style thread-shaped, four times as long as the petals.—Native of the East Indies? It lies in the Linnæan herbarium for *Santalum album*; but the specimen is not an original one, and the real *Santalum album* is no other than *Sirium myrtifolium* of Linnæus; see Roxb. Coromand. v. 1. t. 2. The present species differs widely from the last in appearance, though nearly agreeing with it in several essential characters. The *footstalks* are above half an inch long; *leaves* near three inches, exactly ovate, with an elongated bluntish point; their upper side marked with many transverse parallel veins. *Flowers* small, numerous, with a very long style. The bottom of their *calyx*, above the *germen*, has eight elevated ribs, making as many furrows, which we find also in most of the species, as described by Linnæus.

4. *M. acuminatum*. Pointed Memecylon.—Leaves on short stalks, elliptical, pointed. Umbels axillary, stalked, in pairs, simple. Style about the length of the petals. We find a specimen of this, without name, or mention of its native country, in the herbarium of the younger Linnæus. Its *leaves* agree in size with the last, but are elliptical, tapering at each end, with a longish acute point, and no perceptible veins; their *footstalks* very short and thick. *Umbels* small and simple, axillary, and not from the naked parts of the branches, usually in pairs, each umbel of four or five flowers. *Style* rather above half the length of the former, straight.

5. *M. edule*. Eatable Memecylon. Roxb. Coromand. v. 1. 59. t. 82.—Leaves on short stalks, ovate, acute, veiny, deciduous. Umbels from the defoliated part of the branches, aggregate, stalked. Style the length of the petals.—Very common in every thicket on the coast of Coromandel, flowering in the beginning of the hot season. A small tree, with numerous branches. *Leaves* most like those of the third species, but less pointed, and on shorter stalks. *Flowers* purple, much like those of that species, except that Dr. Roxburgh represents the *style* as not longer than the *petals*. *Berries* the size of a black currant, purple, juicy, astringent, eaten by the natives, who call the plant *Alie*. The *calyx* is drawn with four very distinct lobes. We have seen no specimen, and much suspect this plant may be the same with our *ovatum*, n. 3; but as we find reason to presume the existence of more species than we have seen in sufficient perfection to define them, we think it best to keep these separate.

The specimen mentioned under the first species, as preserved in the Linnæan herbarium, very closely resembles Roxburgh's figure, as to *leaves* and *footstalks*, but the *flowers* are much larger, fewer, on thicker shorter stalks, and axillary. It is marked *Tamba bifa*, which we believe is a Malay name. Our materials are scarcely sufficient to distinguish this plant specifically from the *edule*. It is however most indubitably different from our *ovatum* and *acuminatum*.

6. *M. grande*. Large-leaved Memecylon. Retz. Obf. fasc. 4. 26. Willd. n. 3. (Nedum Schetti; Rheede Hort. Malab. v. 2. 21. t. 15?)—Leaves sessile, ovate, long-pointed. Flowers in dense, axillary, forked clusters.—

Sent

Sent by Mr Christopher Smith from Malacca. The *bracts* are round, knotty, smooth; purplish when young. *Leaves* nearly or quite sessile, crowded, four inches or more in length, one inch and a half wide, ovate at the base, tapering to a bluntish point, scarcely marked with any transverse veins; their substance very thick and cortaceous. *Flowers* larger than in any of the foregoing, purplish, in thick, dense, globose, axillary clusters. *Calyx* very obscurely four-toothed. Of the proportion of the *style* we cannot judge. The plant of the *Hortus Malabaricus* seems, by the description, to be this; but if so, the *flowers* are very badly drawn. We have seen no specimen from Koenig or Retzius, but we presume our plant to be the same as their's by the description.

7. *M. cordatum*. Heart-leaved Memeeylon. Lamarck Dict. v. 4. 89. fig. 2 Willd. n. 4.—Leaves sessile, heart-shaped, bluntish. Umbels axillary, stalked, compound—Brought by Commerfon from the ill. of Bourbon, where it is called *Bois de Mays*. There is a specimen in Sir J. Banks's herbarium, gathered in the Mauritius, by Aublet, who describes it as a tall and handsome tree, with a grey bark. The *leaves* of Commerfon's specimen before us are from one to two inches long, and one broad, obscurely veiny, more or less heart-shaped at the base. *Inflorescence* very different from the last, consisting of no great number of *flowers*, in a variously divided umbel, on a slender stalk, full half an inch long. *Calyx* much less distinctly four-cleft than in Lamarck's figure.

MEMEL, in *Geography*, a town of Prussian Lithuania, situated on the bay called "Curisch-Haff." On one side it has the Baltic; and on the other the Curisch-Haff; and it is also watered by the river Dange. Its harbour is deep, and has a good entrance, and has, not long ago, been improved by two moles, which extend above 50 rods into the Haff or bay. Memel lies under the guns of the fort, and is well inhabited, the number of houses being above 400. It has a German, Lithuanian, and Calvinist church. The burghers, who are divided into those of Altstadt, or the Old Town, and Frederickstadt, are employed in commerce, brewing, soap-boiling, agriculture, fishing, &c. Great quantities of flax, linseed, thread, and hemp, are annually exported from this town. It is well-fortified, and was formerly one of the Hanse towns; and it has now the establishments of a royal magazine, a salt-factory, and a post-office of considerable revenue; 72 miles N.N.E. of Königberg. N. lat. 55° 50'. E. long. 21° 25'.

MEMENE, a town of the island of Ceylon, near the E. coast; 86 miles E.S.E. of Candi.

MEMNISCA, a lake of Canada. N. lat. 52° 20'. W. long. 88° 50'.

MEMMINGEN, a town of Bavaria, on the Iller; which was imperial till the year 1804, when it was transferred, among other indemnities, to the elector of Bavaria. The inhabitants are chiefly Lutherans, but the principal church is possessed by them in common with the Roman Catholics. This town carries on a good trade with Switzerland, Italy, and other adjacent countries, in Bavarian salt, home-spun linen, hops, grain, and other goods. In 1805, it was taken by the French; 22 miles S.S.E. of Ulm. N. lat. 48° 3'. E. long. 10° 7'.

MEMNON, in *Biography*, a native of Rhodes, was a general in the service of the last Persian king, Darius, whom he served, with great fidelity, against Alexander the Great. When that conqueror had lauded in Asia, and was advancing up the country, Memnon advised him not to hazard a battle, but to lay waste the country before the invader. His counsel was rejected, and the battle of the Granicus, in the year 334 B.C. followed, in which Memnon, at the head of the

Greek mercenaries, displayed the greatest valour. After the defeat, he obtained, by his valour, the most honourable conditions, and was almost immediately afterwards created the high admiral of Darius, and governor of the Lower Asia. He had now the important command of the city of Halicarnassus, when it was besieged by Alexander, and employed every effort in his power to save it. The siege was continued a long time, and great numbers of the Macedonians lost their lives before the place. Memnon was generous as well as courageous, for when the fugitive Greek commanders, through hatred of Alexander, opposed the demand from the Macedonians of permission to bury their dead, he would not listen to their remonstrances, alleging that it was unworthy of a Greek to refuse the rite of burial even to an enemy. And hearing one of his soldiers abusing Alexander in gross and vulgar terms, he struck him with his javelin, saying "I hired you to fight Alexander, not to revile him." When he found the place no longer tenable, he threw a strong garrison into the citadel, and with his troops, and the inhabitants with their effects, embarked for the island of Cos. He then advised Darius to make a powerful diversion into Macedonia, as the only means of saving himself from destruction. Darius gave him full power to levy troops, and he exerted himself with so much vigour, that he reduced several of the Cyclades, and the islands of Chios and Lesbos, excepting Mitylene, the capital of the latter. While carrying on a siege against that city he died, and thus freed Alexander from the only foe of whom he stood in awe. Memnon had married Barsine, a Persian lady of high rank, who, with her children, remained at the court of Darius some time, till at length she fell under the power of the conqueror, who took her to his bed, and had a son by her. Univer. Hist.

MEMNON, a Greek historian, is thought to have flourished in the time of Augustus. He wrote a history of the affairs of Heraclea in Pontus, sixteen books of which were abridged by Photius. They came down to the death of an Heracleian ambassador to Julius Cæsar, then emperor. A Latin translation of his history was published at Oxford in 1597.

MEMNON, *Statue of*, a colossal figure of gigantic size, formed of very hard granite, which was found in a mutilated state, and lying on the earth, among the ruins of Thebes in Egypt. Diodorus Siculus (lib. i.) calls it Osmanduë; Strabo says (lib. xvii.), that it was called by the Egyptians Ismandes; but writers in general give it the name of Memnon. This colossus, according to Philostratus, represented a young man in the flower of his age, whose face was turned towards the rising sun; and when the solar rays fell upon it, it was said to speak, or to utter harmonious sounds. Strabo says, that he had been witness to this pretended miracle, which can be attributed to nothing but either the quality of the stone of which it was made, or to the imposture of the priests, or rather to some secret spring, which the learned Kircher, after Pausanias, (in Attic.) alleges to have been a kind of harpichord inclosed within the statue, whose strings being first slackened by the moisture of the night, and then distended by the heat of the sun, broke with a noise resembling that of the string of a violin when it breaks. Cambyles, who spared not the Egyptian ox Apis, having a mind to disclose this mystery, in which he suspected some trick of magic, broke the statue from the head to the middle of the body. Strabo, in his account of this statue, reports, that he and some friends, whilst they were surveying it, heard a certain sound, without being able to determine whether it came from the statue, or the base, or if it proceeded from any of the by-standers; for, he adds,
I would

MEMNON.

I would rather believe any thing else, than imagine that stones ranged in such and such a manner were capable of yielding such a sound. Pausanias informs us, that in his travels through Egypt, he saw the remains of this statue, which Cambyfes had broke. The lower part of the colossus, he says, was still upon its pedestal, but the rest of the body was thrown down to the ground, and every morning at the sun rising yielded the sound already mentioned. Pliny and Tacitus advance the same fact, but without having been witnesses to it: and Lucian informs us, that Demetrius went on purpose to Egypt, to see there the pyramids, and Memnon's statue, from which a voice proceeded at the rising of the sun. Of the fact that this statue uttered sounds, when the sun shone upon it, there can be no doubt; nor can it be difficult to account for the phenomenon. The priests of Thebes might have carried the mechanic art to such a degree of perfection as to be able to fabricate a speaking head, the springs of which were so arranged, that it should pronounce sounds at the rising of the sun. Cambyfes destroyed this wonderful mechanism, by overturning the upper part of the statue; and all the testimonies that are cited to the fact refer only to the trunk, which is now seen upon the pedestal. It is natural, therefore, to attribute the sound of the mutilated colossus to the artifices of the priests, who opposed this pretended miracle to the rise and progress of Christianity. Lucian in particular would have been glad to have availed himself of a phenomenon, which he speaks of with raillery, in this view of it. At all events, it is very certain, that since the commencement of the fourth century of the church, when the inhabitants of Egypt became Christians, no more has been said of the vocal statue, first called Memnon by Herodotus, but in the chronicle of Alexandria, and by the Egyptians themselves, Amenophis. In reply to those who inquire concerning the object which the priests had in view in framing this vocal statue, it has been said that they were in the habit of consecrating their secondary deities to the preservation of the records of their most important discoveries. Amenophis was formed with the same intention. To this purpose the ancients and Jablonski (De Memnon.) who has collected their testimonies with extreme attention, assure us that the seven vowels were consecrated to the seven planets, and that the statue of Amenophis repeated them at a certain epocha. Lucian introduces Eucrates on the stage, and makes him say, "In Egypt I have heard Memnon utter, not according to custom, an insignificant sound, but pronounce from his mouth an oracle in seven sounds." This passage, probably, is a mere pleasantry of Lucian, but it is founded on the general persuasion, that before Cambyfes broke this colossus, it pronounced the seven vowels. The Egyptians, as we learn from Macrobius (Somn. Scip.) regarded the spring equinox as the era of the creation, and to this period the attention of the learned and of the people was chiefly directed. Amoun, a symbolical divinity, was consecrated to it, and all the festivals they celebrated in his honour, related merely to this interesting period. It was at this period the astronomical year commenced; and from hence, according to the priests, the seven planets renewed their course, which they allegorically styled the celestial music. It was at this moment also that Amenophis pronounced the seven vowels which were the symbols of the planets, and which composed the terrestrial music. This famous statue may be called in sacred language the cousin of Osiris (Diod. Sic.) and the image of the sun, since it imitated on earth the office which this luminary performed in the heavens. The priests by making him repeat the seven sounds, of which all languages are formed, and which wonderfully paint our thoughts, were desirous of immortalizing the most beautiful of their dis-

coveries; a discovery which, according to Plato, could only be invented by a god, or by a divine mortal. Perhaps, also, the shadow of this lofty colossus served to mark the instant of the equinox. Its name at least composed of "Ame Nouphi," to tell good tidings, intimates somewhat of the kind, more especially when we consider that the sun, when he arrived at the equator, in his annual course, promised the Egyptians a cessation of the southerly winds, and the approach of the inundation, which made it an object of anxious attention.

There is no less variety of opinion among both ancients and moderns, concerning Memnon himself, than in relation to his statue. Upon the authority of Hesiod, who said that he was king of Thebes, the succeeding Greek authors adopted this opinion. Pausanias, Strabo, Diodorus mention it, and also Pindar and Ovid. M. Le Clerc has a singular opinion concerning this prince; he takes him for Harmon, or Ham, the son of Noah; and Vossius asserts that he was the same with Baaltis, a divinity of the Syrians, male and female, called by the Greeks *Aphrodité*, and represented under the form of a stone. Diodorus Siculus states, "that this prince, the son of Tithonus, led to Troy the Assyrian troops, under the reign of Teutamus, who was the 20th king from Ninus and Semiramis; the Assyrians at that time, *i. e.* more than a thousand years ago, possessing the empire of Asia; Priam, who was tributary to the kingdom of Teutamus, having applied to him for assistance in his pressing exigency, and having sent to him, under the conduct of Memnon, 10,000 Assyrians, and as many Persians, with 200 chariots." We shall close this article with a passage from the learned Huetius's Treatise concerning the Terrestrial Paradise (ch. 13.) which throws more light upon the history of Memnon than any thing that had been before said of him. "Memnon," says that learned prelate, "was the son of Tithonus and Aurora. Tithonus was the brother of Priam king of Troy, and to him is sometimes ascribed the founding of the city Sufa, the capital of Sufiana. From the name of Memnon his son, the citadel was denominated Memnonium, the palace and the walls Memnonian, and Sufa itself the city of Memnon, upon account of the veneration that was paid to him there; and in honour of him a temple was built, whither the Assyrians went and mourned for him, which is to be understood of the people of Sufiana. This is that Memnon who came to the assistance of the Trojans, from whom he derived his original, and who was slain by Achilles. When the Greeks feigned that he was the son of Aurora, they would have us to understand that he came from the east.—I know the history of Memnon is very perplexed, and very differently related. Most ancient authors tell us he was an Ethiopian; this error flows from their confounding Chus, which signifies Sufiana, with Chus which signifies the countries situated upon the borders of the Arabic gulf, I mean Ethiopia and Arabia.—What we are in reason to think concerning Memnon's expedition, may be gathered from Diodorus, and some others. The kingdom of Troas was in the dependence of the empire of Assyria. Tithonus, Priam's brother, who was master of that kingdom, went to the court of the king of Assyria, who gave him the government of Sufiana. There he married in his old age; and because his wife was from a country situated to the east of Greece and Troas, the Greeks, who turned all history into fiction, said he had married the Morning. Memnon and Emathion were the issue of this marriage: the war having after this arisen, Priam applied to Teutamus for assistance, or at least to some king of Assyria, who granted him twenty thousand men, and two hundred chariots of war. Diodorus says this supply consisted of ten thousand Ethiopians, and ten thousand

thoughtful Sufian, returned to the vulgar error, and confounding the Chus of Ethiopia with the Chus of Sufiana. To make the supply of more service, Pentamus gave the command thereof to Memnon, a young prince of the Trojan race, and who was therein concerned for the preservation of Troy. He kept Tithonus with himself upon a count of his age, which rendered him unfit for the expedition, and his prudence which qualified him for being member of his council. Memnon found resistance in his march. The Solyimi, who have been since called the Pisidians, would needs dispute the passage with him; but he defeated them and all that opposed him. He cleared the passage, repaired the ways, and by reason of that long and dangerous march, had the honour to communicate his name to that high way which was denominated Memnonian. He foiled the attacks of the Greeks before Troy with great valour; but at last was slain by Achilles. Various accounts are given of the place of his burial; for not to mention Philostratus, who will have it that he had no sepulchre, but that he was transformed into that miraculous stone, Troas, Phœnicia, and Sufiana contended together for him, and especially Ethiopia, though it has no other right to his burial any more than to his birth, but that which arises from the equivocation of the word Chus. But notwithstanding the obscurity that this equivocation has cast upon this history, Philostratus, George Syncellus, that is, the coadjutor to the church of Constantinople, and Suidas who had read and copied good authors, though often not very judiciously, have not been wanting to bear testimony to the truth; the first telling us that Memnon the Ethiopian, that is Amenophis, never came from Troy, and that he was wrongfully confounded with Memnon the Trojan, not comprehending how Memnon could have brought supply to the Trojans from so great a distance, nor even by what adventure Tithonus had gone and settled in Ethiopia, and came to be king thereof; the second, by distinguishing exactly Amenophis king of Thebes in Egypt, who is also titled Memnon, from the speaking statue of Memnon the son of Tithonus, whom he ranks among the kings of Assyria; and Suidas, by asserting that that Memnon was not an Ethiopian, but a Sufian. Pausanias, though of a very penetrating genius, has but half unravelled this confusion; saying that Memnon the Ethiopian came not from Ethiopia to Troy, but from Sufa. Eustathius, and the scholiast on Pindar, who goes by the name of Triclinius, write that Memnon and Emathion his brother were the only white men among those Ethiopians, though Virgil and others make Memnon black. This remark confirms my opinion; for though the poets and writers of romance have taken the liberty to feign that Andromeda and Charicleus were born white among the blacks, yet this is so singular in the ordinary course of nature, that there is much more reason to believe that Memnon was white, because in fact he was not an Ethiopian."

MEMOIRS, or MEMORIALS, a term now much in use for histories composed by persons who had some share or concern in the transactions they relate, or who were eyewitnesses of them; answering to what the Latins called *commentarii*.

The French are great dealers in this way of writing, and have an infinite number of books of memoirs, containing, for the generality, the lives, actions, intrigues, amours, &c. of the writers.

MEMOIRS also denote a journal of the acts and proceedings of a society; or a collection of the matters debated, transacted, &c. therein. Such are the Memoirs of the Royal Academy of Sciences, &c.

MEMORY, *memoria*, a power or faculty of the mind, which receives, retains, and recollects what, its creation requires, affects of things presented to the understanding.

Of all the faculties, there is none harder to account for, or that has perplexed philosophers more, than the memory. Some will have it a more or less, as the age, sex, &c. differ. Locke, in an "Essay concerning the Understanding of Memory," makes it to consist in a fluid, or ideas or images, formed occasionally by the mind, out of the finer parts of the brain, and disposed or held by its order.

Deseartes and his followers maintain, that the animal spirits, exciting a motion in the most delicate fibres of the brain, leave a kind of traces or bottles, which occasion our remembrance. Hence it happens, that by passing several times over the same things, the spirits becoming accustomed to the same passages, leave them open, and so make their way without any effort or labour; and in this consists the ease wherewith we recollect such ideas. Thus wine is found to sharpen the memory, because wine puts the animal spirits in motion, and agitates the fibres of the brain more briskly.

Father Malebranche expresses his notion of memory thus: "It being granted, that all our different perceptions are owing to changes happening in the fibres of the principal part of the brain, wherein the soul more immediately resides, the nature of the memory is obvious: for as the leaves of a tree, that have been folded for some time in a certain manner, preserve a facility of disposition to be folded again in the same manner; so the fibres of the brain, having once received certain impressions by the courses of the animal spirits, and by the action of objects, preserve, for some time, a facility to receive the same disposition. Now it is in this facility that memory consists; for we think the same things, when the brain receives the same impressions.

"Farther, as the animal spirits act sometimes more briskly, and sometimes more languidly, on the substance of the brain; and as sensible objects make much deeper, and more lasting impressions, than the imagination alone; it is easy, on this scheme, to conceive why we do not remember all things alike; why a thing, for instance, seen twice, is represented more vividly to the mind than another seen but once; and why things that have been seen, are usually remembered more distinctly, than those that have been only imagined, &c.

"Old men are defective in memory, and cannot learn any thing without much difficulty, because they want animal spirits to make new traces, and because the fibres of the brain are become too hard to receive, or too moist to retain, such impressions. For the same reason, those who learn with the greatest ease forget the soonest; in regard when the fibres are soft and flexible, objects make a slight impression, which the continual course of animal spirits easily wears off. On the contrary, the fibres of those who learn slowly, being less flexible, and less subject to be shaken, the traces are more deeply engraven, and last the longer. From all which observations it follows, that the memory is absolutely dependent on the body; being impaired or strengthened, according to the changes that befall the body; a fall, the transports of a fever, &c. being frequently found to erase or blot out all the traces, to bear away all the ideas, and to cause an universal forgetfulness."

The chief difficulty that embarrasses this doctrine of memory is to conceive how such an infinite number of things, as the head is stored with, should be ranged in so much order in the memory, as that the one should not efface the other; and how, in such a prodigious assemblage of traces impressed

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on the brain, the animal spirits should awake precisely those which the mind has occasion for.

Memory, according to Mr. Locke, is, as it were, the storehouse of our ideas. For the narrow mind of man not being capable of having many ideas under view and consideration at once, it was necessary to have a repository, in which to lay up those ideas which it may afterwards have use for. But our ideas being nothing but actual perceptions in the mind, which cease to be any thing when there is no perception of them; this laying up of our ideas in the repository of the memory, signifies no more than this, that the mind has a power, in many cases, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the assistance of this faculty, that we are said to have all those ideas in our understandings, which we can bring in sight, and make the objects of our thoughts, without the help of those sensible qualities which first imprinted them there.

Attention and repetition help much to the fixing of ideas in our memories: but those which make the deepest and most lasting impressions, are those which are accompanied with pleasure and pain. Ideas but once taken in and never again repeated, are soon lost; and those of colours in such as lost their sight when very young.

The memory of some men is tenacious even to a miracle; but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest, and in minds the most retentive; so that if they be not sometimes renewed, the print wears out, and at last there remains nothing to be seen.

Those ideas that are often refreshed by a frequent return of the objects or actions that produce them, fix themselves best in the memory, and remain longest there: such are the original qualities of bodies, *viz.* solidity, extension, figure, motion, &c. and those that almost constantly affect us, as heat and cold.

In memory, the mind is oftentimes more than barely passive; for it often sets itself to work to search some hidden ideas; sometimes they start of their own accord; and sometimes tempestuous passions tumble them out of their cells. This faculty other animals seem to have to a great degree, as well as men, as appears by birds learning of tunes, and their endeavours to hit the notes right. For it seems impossible that they should endeavour to conform their voices (as it is plain they do) to notes whereof they have no idea. Essay concerning Hum. Und. book ii. chap. 10.

Dr. Hartley, agreeably to his mechanical theory of the human mind, defines memory to be that faculty by which traces of sensations and ideas recur, or are recalled, in the same order and proportion, accurately or nearly, as they were once presented: and he observes, that memory depends entirely or chiefly on the state of the brain, which is peculiarly conformable to his notion of vibrations. The rudiments of memory, he says, are laid in the perpetual recurrency of the same impressions, and clusters of impressions: and thus he endeavours to account for the peculiar imperfections of the memory in children and aged persons, as well as for other facts pertaining to the exercise of this faculty. Obs. on Man, vol. i. p. 374, &c.

Those who adopt Hartley's theory enumerate among other phenomena of memory such as the following: ideas of recollection are distinguished from sensations, chiefly by a difference in the vividness of the impressions, so that when from disease, or any cause, ideas become as vivid as sensations, they are mistaken for sensations, as in phrensy; and also by

the associates which accompany them. Ideas of memory are distinguished from reveries, chiefly by the readiness and strength of the associations by which they are cemented together; and recollected ideas are also distinguished from reveries by their connection with known facts, and by various methods of reasoning. Memory, it is also said, depends entirely or chiefly on the state of the brain. Hence diseases, concussions of the brain, and spirituous liquors impair it; and it generally returns again with the return of health. Memory also differs in different ages, inasmuch that children soon learn and soon forget; old people learn with difficulty, and remember best what they learned when young; and this, it is alleged, is agreeable to the theory of vibrations. Sensations, attended with great pleasure or pain, make a deep impression on the memory, which is probably owing to the vigorous vibrations which they excite. Sensible ideas gradually decay in the memory, if not refreshed by new sensations. Voluntary recollection is performed by calling up associated ideas, which by degrees introduce the idea in question. Some persons of weak judgment possess retentive memories; but there are limits beyond which the two powers of receiving and of retaining ideas cannot consist with each other. Memory is a faculty incessantly exercised while thought continues; nor is the mind wholly deprived of it, though it is often much impaired. The excellence of memory consists partly in its strength of retention, and partly in the quickness of recollection. All the faculties of the mind are dependent on the memory: and though some persons may have strong memories with weak judgment, no person can have a strong judgment whose memory is remarkably defective.

It is commonly supposed, says professor Dugald Stewart, (*ubi infra*) that genius is seldom united with a very tenacious memory. "So far, however," says this ingenious writer, "as my own observation has reached, I can scarcely recollect one person who possesses the former of these qualities, without a more than ordinary share of the latter. On a superficial view of the subject, indeed, the common opinion has some appearance of truth; for we are naturally led, in consequence of the topics about which conversation is usually employed, to estimate the extent of memory by the impression which trivial occurrences make upon it; and these in general escape the recollection of a man of ability, not because he is unable to retain them, but because he does not attend to them. It is probable, likewise, that accidental associations, founded on contiguity in time and place, may make but a slight impression on his mind. But it does not therefore follow, that his stock of facts is small. They are connected together in his memory by principles of association, different from those which prevail in ordinary minds, and they are on that very account the more useful; for as the associations are founded upon real connections among the ideas, (although they may be less conducive to the fluency, and perhaps to the wit of conversation,) they are of incomparably greater use in suggesting facts which are to serve as a foundation for reasoning or invention."—"Montaigne frequently complains in his writings of his want of memory: and he indeed gives many very extraordinary instances of his ignorance in some of the most ordinary topics of information. But it is obvious to any one who reads his works with attention, that this ignorance did not proceed from an original defect of memory, but from the singular or whimsical direction which his curiosity had taken at an early period of life."—"I can do nothing," says he, "without my memorandum book; and so great is my difficulty in remembering proper names, that I am forced to call

call my domestic servants by their offices. I am ignorant of the greater part of our coins in use; of the difference of one grain from another, both in the earth and in the granary: what use heaven is of in making bread, and why wine must stand some time in the vat before it ferments."—"Yet the same author appears evidently, from his writings, to have had his memory stored with an infinite variety of apophthegms and of historical passages, which had struck his imagination: and to have been familiarly acquainted, not only with the names, but with the absurd and exploded opinions of the ancient philosophers." The foregoing observations serve to account, in part, for the origin of the common opinion, that genius and memory are seldom united in great degrees in the same person; and it so appears, that some of the facts, on which that opinion is founded, do not justify such a conclusion. There are, however, other circumstances, that seem rather to indicate an inconsistency between extensive memory and original genius. "The species of memory which excites the greatest degree of admiration in the ordinary intercourse of society, is a memory for detached and insulated facts; and it is certain that those men who are possessed of it, are very seldom distinguished by the higher gifts of the mind, and such a species of memory is unfavourable to philosophical arrangement; because it in part supplies the place of arrangement." Dr. Pemberton informs us, that sir Isaac Newton was often at a loss when the conversation turned on his own discoveries; they probably made but a slight impression on his mind, and a consciousness of his inventive powers prevented him from taking much pains to treasure them up in his memory. He nevertheless, as Dr. Pemberton says, perfectly understood his own writings, though his memory was much decayed in the last years of his life. (See Preface to Pemberton's View of Newton's Philosophy.) "A man of original genius," says professor Stewart, "who is fond of exercising his reasoning powers anew on every point as it occurs to him, and who cannot submit to rehearse the ideas of others, or to repeat by rote the conclusions which he has deduced from previous reflexion, often appears to superficial observers to fall below the level of ordinary understandings; while another, destitute both of quickness and invention, is admired for that promptitude in his decisions, which arises from the inferiority of his intellectual abilities." Here we cannot forbear citing one of the aphorisms of lord Bacon: "Reading makes a full man, writing a correct man, and speaking a ready man." See also on this subject Watt's Improvement of the Mind, chap. xvii. or Works, vol. v. p. 275, &c.

Memory is a source of refined and permanent pleasure: painful recollections gradually subside within the limits of pleasure: and if time sufficient be allowed, by the power of association, all pain will be ultimately absorbed, and the pleasures of memory will be pure and unmixed with misery. See Rogers's Pleasures of Memory.

Memory, according to Dr. Reid, is an original faculty given us by the author of our being, of which we can give no account, but that we are so made. I believe most firmly, says this author, what I distinctly remember; but I can give no reason of this belief. It is the inspiration of the Almighty that gives me this understanding. Memory, he says, is always accompanied with the belief of that which we remember; and this belief we account real knowledge, no less certain than if it was grounded on demonstration. The testimony of witnesses, in causes of life and death, depends upon it, and all the knowledge of mankind, with regard to past events, is built on this foundation. Reid's Essays on the Intellectual Powers of Man, Ess. iii. ch. 1, 2, 7.

The word memory, says professor Donald Stewart, is not employed uniformly in the same sense; it is sometimes employed to express the capacity of retaining knowledge, and sometimes the power of recalling it to our thoughts, when we have occasion to apply it to use. When we speak of a retentive memory, we use it in the former sense; when of a ready memory, in the latter. The various particulars which compose our stock of knowledge sometimes recur to us spontaneously, or at least without any interference on our part; in other cases, they are recalled by an effort of our will. The former operation of the mind is denoted by Memory; the latter, though sometimes called by the same name, is more properly distinguished by the word Recollection. The operations of memory relate either to things and their relations, or to events. In the former case, thoughts which have been previously in the mind may recur to us, without suggesting the idea of the past, or of any modification of time whatever, as when I repeat over a poem which I have got by heart, or when I think of the features of an absent friend. In these cases, the operations of memory do not necessarily involve the idea of the past. But when I think of events, I not only recal to the mind the former objects of its thoughts, but I refer the event to a particular point of time; so that of every such act of memory, the idea of the past is a necessary concomitant. If it be inquired, to what it is owing that the memory retains some things in preference to others? our author replies, that this may be ascribed to two principles of our nature, upon which memory is dependent, and with which it is very intimately connected; these are *attention* and the *association of ideas*. Without attention, even the objects of our perceptions make no impression on the memory. (See Bacon, Nov. Org. lib. ii. aphor. 6.) This attention, though it be a voluntary act, requires experience to have it always under command. In the case of objects to which we have been taught to attend at an early period of life, or which are calculated to rouse the curiosity, or to affect any of our passions, the attention fixes itself upon them, as it were, spontaneously, and without any effort on our part, of which we are conscious. On the other hand, if an object does not interest some principle of our nature, we may examine it again and again, with a wish to treasure up the knowledge of it in the mind, without our being able to command that degree of attention which may lead us to recognise it the next time we see it. By this kind of reasoning we can account for a well-known fact, that objects are easily remembered which affect any of the passions. The passion assists the memory, not in consequence of any immediate connection between them, but as it presents, during the time it continues, a steady and exclusive object to the attention.

Our ingenious author proceeds to state the connection between memory and the association of ideas. This, he says, is so striking, as to have induced some to suppose, that the whole of its phenomena might be resolved into this principle. This the professor does not allow. "The association of ideas connects our thoughts with each other, so as to present them to the mind in a certain order; but it presupposes the existence of these thoughts in the mind; or, in other words, it presupposes a faculty of retaining the knowledge which we acquire. It involves also a power of recognizing, as former objects of attention, the thoughts that from time to time occur to us; a power which is not implied in that law of our nature, which is called the association of ideas."—"On the other hand, it is evident that, without the associating principle, the power of retaining our thoughts, and of recognizing them when they occur to us, would have

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been of little use; for the most important articles of our knowledge might have remained latent in the mind, even when those occasions presented themselves to which they are immediately applicable. In consequence of this law of our nature, not only are all our various ideas made to pass from time to time in review before us, and to offer themselves to our choice as subjects of meditation; but when an occasion occurs which calls for the aid of our past experience, the occasion itself recalls to us all the information upon the subject which that experience has accumulated." Our author observes, "that the various theories which have attempted to account for memory by traces or impressions in the sensorium, are obviously too unphilosophical to deserve a particular refutation." He adds, after some other appropriate remarks on this subject, "that the immediate dependence of this faculty on the state of the body, which is more remarkable than that of any other faculty whatever, (as appears from the effects produced on it by old age, disease, and intoxication,) is apt to strike those who have not been much conversant with these inquiries, as bestowing some plausibility on the theory which attempts to explain its phenomena on mechanical principles." Accordingly, it is recommended to medical writers to be at more pains than they have been at hitherto, in order to ascertain the various effects which are produced on the memory by disease and old age; effects which are widely diversified in different cases. "In some it would seem that the memory is impaired, in consequence of a diminution of the power of attention; in others, that the power of recollection is disturbed, in consequence of a derangement of that part of the constitution on which the association of ideas depends. The decay of memory, which is the common effect of age, seems to arise from the former of these causes."—"As far as the decay of memory, which old age brings along with it, is a necessary consequence of a physical change in the constitution, or a necessary consequence of a diminution of sensibility, it is the part of a wise man to submit cheerfully to the lot of his nature. But it is not unreasonable to think, that something may be done by our own efforts, to obviate the inconveniences which commonly result from it. If individuals, who, in the early part of life, have weak memories, are sometimes able to remedy this defect, by a greater attention to arrangement in their transactions, and to classification among their ideas, than is necessary to the bulk of mankind, might it not be possible, in the same way, to ward off, at least to a certain degree, the encroachments which time makes on this faculty? The few old men, who continue in the active scenes of life to the last moment, it has been often remarked, complain, in general, much less of a want of recollection than their contemporaries. This is undoubtedly owing partly to the effect which the pursuits of business must necessarily have in keeping alive the power of attention. But it is probably owing also to new habits of arrangement, which the mind gradually and insensibly forms from the experience of its growing infirmities."

The learned professor devotes a section of his excellent work to the illustration of the varieties of memory in different individuals. "As the great purpose," he says, "to which this faculty is subservient, is to enable us to collect, and to retain, for the future regulation of our conduct, the results of our past experience; it is evident that the degree of perfection which it attains in the case of different persons, must vary; first, with the facility of making the original acquisition; secondly, with the permanence of the acquisition; and, thirdly, with the quickness or readiness with which the individual is able, on particular occasions, to apply

it to use. The qualities of a good memory are, therefore, in the first place, to be susceptible; secondly, to be retentive; and, thirdly, to be ready." These three qualities are rarely united in the same person.

Our author has advanced some very ingenious and judicious observations on the difference between a *casual* and a *philosophical* memory. The bulk of mankind associate their ideas chiefly according to their most obvious relations, those, for example, of resemblance and analogy; and, above all, according to the casual relations arising from contiguity in time and place; whereas, in the mind of a philosopher, ideas are associated according to those relations which are brought to light in consequence of particular efforts of attention, with the relations of cause and effect, or of premises and conclusion. The advantage is greatly in favour of the philosopher; the arrangement he uses strengthens his memory, assists his invention, enables him to reason synthetically, and to correct his intellectual defects; but this kind of memory is not favourable to conversation. The man of casual memory is open to every impression, and readily accommodates his ideas to any circumstance which may occur. But the philosopher who thinks closely and reasons systematically, is deficient in ease and quickness, and is in danger of becoming tedious by long discourses. And as nothing appears weaker or more absurd than a theory partially stated, it frequently happens that men of ingenuity, by attempting it, sink in the vulgar apprehension, below the level of ordinary understandings. Professor Stewart, after pointing out in various particulars the difference between philosophical and casual memory, observes, that they constitute the most remarkable of all the varieties which the minds of different individuals, considered in respect of this faculty, present to our notice. He afterwards enumerates, in detail, and with appropriate illustration, several other varieties of a less striking nature. Stewart's *Elements of the Philosophy of the Human Mind*, chap. vi. § 1, 2, 3.

For the difference between memory and imagination; see IMAGINATION.

Aristotle distinguishes between memory and reminiscence. Memory is a kind of habit which is not always in exercise with regard to things we remember, but is ready to suggest them when there is occasion. The most perfect degree of this habit is, when the thing presents itself to our remembrance spontaneously, and without labour, as often as there is occasion. A second degree is, when the thing is forgot for a longer or shorter time, even when there is occasion to remember it, yet at last some incident brings it to mind without any search. A third degree is, when we cast about and search for what we would remember, and so at last find it out. It is this last which Aristotle calls reminiscence, as distinguished from memory. Reminiscence, therefore, includes a will to recollect something past, and a search after it. Aristotle says, that brutes have not reminiscence, which Dr. Reid thinks to be probable, but, says he, they have memory. Thus, a dog knows his master after long absence. A horse will trace back a road he has once gone as accurately as a man. Reid, *ubi supra*. See the preceding part of this article.

History furnishes us with several surprising instances of the retentive powers of the faculty of memory. Seneca says of himself, that, by the mere effort of his natural memory, he was able to repeat two thousand words upon once hearing them, each in its order; though they had no dependence or connection on each other. After which he mentions a friend of his, Portius Latro, who retained in his memory all the declamations he had ever spoken, and never
found

found his memory fail him, even in a single word. He also mentions Cynæa, ambassador to the Romans from king Pyrrhus, who, in one day, had so well learnt the names of his spectators, that the next he saluted the whole senate, and all the populace assembled, each by his name. Pliny says, that Cyrus knew every soldier in his army by name; and L. Scipio, all the people of Rome. Charmidas, or rather Carneades, when required, it is said, would repeat any volume found in the libraries as readily as if he were reading. Dr. Wallis tells us, that without the assistance of pen and ink, or any thing equivalent, he was able in the dark, by mere force of memory, to perform arithmetical operations, as multiplication, division, extraction of roots, &c. to forty places. Particularly, that, in February 1671-2, at the request of a foreigner (by night in bed) he proposed to himself a number of fifty-three places, and found its square root to twenty-seven places; and without ever writing down the number, dictated it from his memory, at his next visit, twenty days afterwards.

The perfection of memory consists in two things; readily to admit the impressions or images of things; and to preserve them from oblivion, that the understanding may have recourse to them, and employ them for such purposes, as reason shall direct. In order to assist and improve this faculty, every kind of intemperance and excess must be carefully avoided; and when we would commit any thing to memory, our first concern should be to understand it thoroughly; we should commit things to memory in a methodical and regular manner; writing down any thing is likewise a great advantage towards remembering it; a frequent review and careful repetition of the things that are learned will help to fix them in the memory, and likewise an abridgment of them in a narrow compass; conversation upon them with intelligent companions will also be found useful; care should likewise be taken not to overburden the memory: such seasons should be made choice of as are most proper for the exercise of this faculty, such are the evening and morning; and the most effectual way of gaining a good memory, is its constant and moderate exercise. Ward's Or. vol. ii. sect. 51. Rollin's Belles Lettres p. 208—216, sixth ed. Watts's Improvement of the Mind, ubi supra. Stewart's Elem. of the Philosophy of the Human Mind, ch. vi. sect. 3. 4, 5.

MEMORY, *Local*, or *Artificial*, is an art, or invention, by means of which the memory is supposed to be aided, strengthened, and enlarged.

This art seems to consist in nothing else but a certain method of coupling or associating the ideas of things to be remembered, with the ideas of other things, already disposed orderly in the mind, or that are before the eyes. It is of an old standing, having been practised by many of the ancient rhetoricians, under the denomination of "topical memory;" some of whom are said to have made use of paintings, images, and emblems, on this occasion; though others contented themselves with the parts, members, ornaments, furniture, and other circumstances of the place where they were to speak. Muretus tells us that a young man of Corsica pretending to do wonders this way, Muretus put him to the trial; and upon dictating to him two or three thousand words, some Greek, some Latin, some Barbarous; all without any relation to each other, and the greatest part without any meaning at all; the artist immediately, and without any hesitation, or the least stumbling or displacing, repeated them all, from first to last, in the same order wherein they had been dictated; and this done, beginning where he ended, he repeated them all backwards, from last to first. Adding, that this was but a slight essay of his memory; and that he

would undertake to repeat thirty-six thousand words in the same manner.

The truth is, this art seems better calculated for retaining things without any coherence or dependence on one another, as mere words or sounds, &c. than for things where reason or judgment are any way required.

Raim. Lully took so much pains with it, that it now goes by his name, being called *Lully's art*.

Many have been the attempts, in all ages, to assist the memory. Some have had recourse to medicine, such as Horstius, Marfilus Vicinus, Johnston and others. That good health, a good digestion, and a mind free from care, are helps in this respect, is an old observation. That attention, application, frequent recapitulation, are necessary, is known to every one. But whether, besides natural health and parts, and the exercise of our faculties, art may not give a farther assistance to memory, has been a question. Simonides is said to have been the first who found out the art of memory. His method was by a choice of *places* and *images*, as a repository of ideas; such, for instance, as a large house divided into several apartments, rooms, closets, &c. All these, and their order, were to be rendered extremely familiar to the imagination and memory. Then, whatever was to be remembered, was by some symbolical representation or another, as an anchor for navigation, to be connected with some part of the house, or other artificial repository, in a regular manner. Cicero and Quintilian give us some account of this method, and speak of it with respect. As far as it was the object of this species of artificial memory to assist an orator in recollecting the plan and arrangement of his discourse, the accounts which are given of it by the ancient rhetoricians are abundantly satisfactory. It appears, however, that its use was more extensive; and that it was so contrived, as to facilitate the recollection of a premeditated composition. In what manner this was done, it is not easy to conjecture from the imperfect explanations of the art, which have been transmitted to modern times. The reader may consult Cicero de Orat. lib. ii. cap. 87, 88. Rhetor. ad Herennium, lib. iii. cap. 16, &c. Quintil. Inst. Orat. lib. xi. cap. 2.

Several moderns have attempted improvements of artificial memory. There was a collection of various treatises of this kind published at Leipzig; this, and Bruxius's *Simonides Redivivus*, are commended by Morhof. Pafchius gives us some account also of several authors who have treated of this art. It is certainly of use in history and chronology. The chief artifice, in this respect, is to form an artificial word, the letters of which shall signify numbers. Hence a date or era may more easily be recapitulated and remembered than without such a contrivance. This invention is mentioned as a secret known to few, by Pafchius. It has been profecuted in England, by Dr. Grey, in his well-known work, entitled "*Memoria Technica*," by means of which a great mass of historical, chronological, and geographical knowledge is comprised in a set of verses, which the student is supposed to make familiar to himself as school-boys do the rules of grammar.

The method is this: to remember any thing in history, chronology, geography, &c. a word is formed, the beginning of which being the first syllable or syllables of the thing to be remembered, does, by frequent repetition, of course draw after it the latter parts, which is so contrived as to give the answer. Thus, in history, the deluge happened in the year before Christ 2348. This may be signified by the word *Dél étok*; *Dél* standing for deluge, and *étok* for 2348.

MEMORY.

How these words came to signify these things, or contribute to the remembering them, is now to be shewn.

The first thing to be done is to learn exactly the following series of vowels and consonants, which are to represent the numerical figures, so as to be able at pleasure to form a technical word, which shall stand for any number, or to resolve a word already formed into the number it stands for :

<i>a</i>	<i>e</i>	<i>i</i>	<i>o</i>	<i>u</i>	<i>au</i>	<i>oi</i>	<i>ei</i>	<i>ou</i>	<i>y</i>
1	2	3	4	5	6	7	8	9	0
<i>b</i>	<i>d</i>	<i>t</i>	<i>f</i>	<i>l</i>	<i>s</i>	<i>p</i>	<i>k</i>	<i>n</i>	<i>z</i>

Here *a* and *b* stand for 1, *e* and *d* for 2, *i* and *t* for 3, and so on. These letters are assigned arbitrarily to the respective figures, and may very easily be remembered. The first five vowels in order naturally represent 1, 2, 3, 4, 5. The diphthong *au*, being composed of *a*, 1, and *u*, 5, stands for 6; *oi* for 7, being composed of *o*, 4 and *i*, 3; *ou* for 9, being composed of *o*, 4 and *u*, 5; the diphthong *ei* will easily be remembered for 8 (eight), being the initials of the word. In like manner for the consonants, where the initials could conveniently be retained, they are made use of to signify the number, as *t* for 3, *f* for four, *s* for six, and *n* for 9. The rest were assigned without any particular reason, unless that possibly *p* may be more easily remembered for 7, or *septem*, *k* for 8, or *octo*, *d* for 2, or *duo*; *b* for 1, as being the first consonant, and *l* for 5, being the Roman letter for 50, than any others that could have been put in their places. It is farther to be observed, that *z* and *y* being made use of to represent the cypher, where many cyphers meet together, as 1000, 1000000, &c. instead of a repetition of *azyzyzy*, &c. let *g* stand for 100, *th* for a thousand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oag* 900, &c. *ath* 1000, *am* 1000000, *loun* 59000000, &c. Fractions may be set down in the following manner: let *r* signify the line separating the numerator and denominator, the first coming before the other after it; as *iro* $\frac{2}{3}$, *urp*, $\frac{5}{7}$, *pourag* $\frac{79}{100}$, &c. When the numerator is 1 or unit, it need not be expressed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri* $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *ratb* $\frac{1}{1000}$.

This is the principal part of the method, which consists in expressing numbers by artificial words. The application to history and chronology is also performed by artificial words. This part of the art consists in making such a change in the ending of the name of a place, person, planet, coin, &c. without altering the beginning of it, as shall readily suggest the thing sought, at the same time that the beginning of the word, being preserved, shall be a leading or prompting syllable to the ending of it so changed. Thus in order to remember the years in which Cyrus, Alexander, and Julius Cæsar, founded their respective monarchies, the following words may be formed; for Cyrus, *Cyrats*; for Alexander, *Alexita*; for Julius Cæsar, *Julios*. *Uts* signifies, according to the powers assigned to the letters before mentioned, 536; *ita* is 331, and *os* is 46. Hence it will be easy to remember, that the empire of Cyrus was founded 536 years before Christ, that of Alexander 331, and that of Julius Cæsar, 46.

For the farther application of this method, we refer to the ingenious author's own account. We shall only add, that technical verses contribute much to the assistance of the memory, both as they generally contain a great deal in a little compass, and also because, being once learned, they are seldom or never forgot. The author before quoted has given us several specimens of such verses in history, chronology, geography, and astronomy, as also the Jewish, Grecian, and Roman coins, weights and measures, &c. He ad-

vises his reader to form the words and verses for his own use himself; as he perhaps will better remember them than those formed by the author.

Having given an account very much in detail of the most approved artifices that have been contrived for assisting the memory, our limits will not allow our specifying any of those modern methods for this purpose that have engaged popular attention; probably without much claim to originality, and which, as long as they are not explicitly divulged, may be more lucrative to those who teach than improving to those who are at the pains and expence of acquiring them. Every attempt, however, to improve this important faculty merits encouragement. See *MNEMONIC Tables*.

Concerning the utility of the system above stated, the ingenuity of which has been acknowledged, opposite opinions have been entertained. The prevailing opinion is, as professor Stewart conceives, against it; although it has been mentioned in terms of high approbation by some writers of eminence. Dr. Priestley, whose judgment in matters of this nature commands respect, has said of it (*Lectures on History*, p. 157), that "it is a method so easily learned, and which may be of so much use in recollecting dates when other methods are not at hand, that he thinks all persons of a liberal education inexcusable, who will not take the small degree of pains that is necessary to make themselves masters of it; or who think any thing mean, or unworthy of their notice, which is so useful and convenient." The learned professor, of whose observations we have so often availed ourselves, very justly remarks, that "in judging of the utility of this, or of any other contrivance of the same kind, to a particular person, a great deal must depend on the species of memory which he has received from nature, or has acquired in the course of his early education. Some men have an extraordinary facility in acquiring and retaining the most barbarous and the most insignificant verses; which another person would find as difficult to remember, as the geographical and chronological details of which it is the object of this art to relieve the memory. Allowing, therefore, the general utility of the art, no one method, perhaps, is entitled to an exclusive preference; as one contrivance may be best suited to the faculties of one person, and a very different one to those of another."—"One important objection applies to all of them, that they accustom the mind to associate ideas by accidental and arbitrary connections; and, therefore, how much soever they may contribute, in the course of conversation, to an ostentatious display of acquired knowledge, they are, perhaps, of little real service to us, when we are seriously engaged in the pursuit of truth. I own too, (says the professor,) I am very doubtful with respect to the utility of a great part of that information which they are commonly employed to impress upon the memory, and on which the generality of learned men are disposed to value themselves. It certainly is of no use, but in so far as it is subservient to the gratification of their vanity; and the acquisition of it consumes a great deal of time and attention, which might have been employed in extending the boundaries of human knowledge. To those, however, who are of a different opinion, such contrivances as Grey's may be extremely useful; and to all men they may be of service, in fixing in the memory those insulated and uninteresting particulars, which it is either necessary for them to be acquainted with, from their situation; or which custom has rendered, in the common opinion, essential branches of a liberal education."

As to Simonides's method, Quintilian says he will not deny it to be of some use; for instance, in repeating a multitude of

of words in the order they occur, and in things of this nature; but he thinks it of less use in getting by heart a continued oration, and in that respect rather an incumbrance. He himself advises, if the speech to be remembered be long, to get it by heart in parts, and those not very small. The partition ought chiefly to be made according to the different topics. He thinks it best to get things by heart tacitly, and if, the better to fix the attention, the words be pronounced, yet it should be in a low voice. Apt divisions help the memory greatly. But after all, the great art of memory is exercise; to get many things by heart, and daily, if possible. Nothing increases more by use, or suffers more by neglect, than the memory. At whatever age a man aims at the improvement of this faculty, he should patiently submit to the uneasy labour of repeating what he has read or written. Here, as in other cases, where habits are to be acquired, exercise should be increased by degrees. Quint. Inst. Orat. lib. xi. cap. 2. p. 989.

Lord Bacon enumerates several helps to memory, as order, artificial place, verse, whatever brings an intellectual thing to strike the senses, and those things which make an impression by means of a strong passion, as fear, surprize, &c. Those things also sink deepell, and dwell longest in the memory, which are impressed upon a clear mind unprejudiced either before or after the impression, as the things we learn in childhood, or think of just before going to sleep; as likewise the first time things are taken notice of.

A multitude of circumstances also, or, as it were, handles or holds to be taken, help the memory; as the making many breaks in writing, reading or repeating aloud; but as to this last, see Quintilian's opinion before mentioned. Those things which are expected, and raise the attention, stick better than such as pass slightly over the mind; whence if a man reads any writing twenty times over, he will not remember it so well, as if he read it but ten times with trying between whiles to repeat it, and consulting the copy where his memory failed. Bacon's Works abr. vol. ii. p. 475. See also vol. i. p. 135, 136. vol. iii. p. 176, and the article *MNEMONIC Tables*.

MEMORY, Weakness or Loss of, in *Medicine*, technically called *amnesia*, is a disease which appears to depend upon two opposite conditions of the brain; namely, upon a plethora or oppressed state of that organ, and upon an extreme debility of its vessels and languor of the circulation. Hence it arises from two different sets of causes, and is to be cured by two opposite modes of treatment. The first mentioned species of the disease is connected with the lethargic state preceding apoplectic attacks, or with the paralytic condition that often succeeds them: it arises also from local injury to the brain, occasioned by wounds and blows, which produce concussion or pressure upon the brain. The plan of treatment directed for these morbid states, and consisting chiefly of local evacuations, with low diet, will be necessary for the relief of these varieties of *amnesia*. But the second species, connected with a feeble circulation in the head, such as is said to arise from excessive indulgence of the venereal appetite, or to follow the continued use of spirituous liquors, where there is no plethora, requires the use of tonics and of opium; the exciting causes being also avoided. (See Sauvages Nosol. Method. Spec. 1. Amnesia à Venere. Spec. 7. A. à temulentia.) Where the disease results from old age, however, or from any organic changes, which may have taken place in the brain itself, a cure cannot of course be expected from any expedient.

MEMORY, Time of, in *Law*, has been long ago ascertained by the law to commence from the beginning of the reign of Richard I. (2 Inst. 238, 239.) This rule was adopted,

when by the statute of Westm. 1. (3 Edw. I. c. 39) the reign of Richard I. was made the time of limitation in a writ of right. But since by the statute 32 Hen. VIII. c. 2. this period (in a writ of right) hath been very rationally reduced to sixty years, it seems unnecessary that the date of legal prescription or memory should still continue to be reckoned from an era so very antiquated. See Litt. § 170. 34 Hen. VI. 37. 2 Roll. Ab. 269. pl. 16. See *MONUM.*

MEMORY Rocks, in *Geography*, a reef of rocks among the Bahama islands. N lat. 27 3. W. long 79 30'

MEMPHIS, in *Ancient Geography*, a large and populous city of Egypt, on the left side of the Nile. Concerning the epocha of its foundation and also of its destruction, as well as its precise situation, writers are not agreed. According to Diodorus Siculus it was seven leagues in circumference, and it contained magnificent temples and palaces. As to its position, Dr. Shaw says, that opposite to Cairo, on the banks of the Nile, which looks towards Libya, is the village of Gisa, where the ancient Memphis stood, the ruins of which are now covered and buried with earth. The authors of the Universal History adopt the opinion of Dr. Shaw, and represent Memphis as situated on the site now occupied by Gisa. According to Herodotus, Memphis was situated on the narrowest spot in Egypt, on the western bank of the Nile; a lake formed by the waters of the river surrounding it to the north and the west. But Strabo is more circumstantial in his details; and he says, that at 40 stadia, or 1½ league from Memphis, rises a stony hill, where a great number of pyramids are built. This situation, it is said, does not correspond with that of Gisa, which is three leagues from the nearest pyramids, and six from those of Sacæra. (See GIZÉ.) Pliny (N. H. l. vi.) says, that the three great pyramids, which are seen by navigators from all parts, are situated on a barren and stony hill, between Memphis and the Delta, one league from the Nile, two from Memphis, and near the village of Busris. Diodorus also places the pyramids 15 miles from Memphis. From these authorities we may infer, that as the pyramids are between Memphis and the Delta, and it is certain that Gisa or Gizé is between the pyramids and the Delta, Memphis could not have been situated on the spot where Gisa stands; or, in other words, Memphis, by Pliny's description, is two leagues to the southward of the pyramids, and Gisa being three leagues from them to the northward, it could not have been built on the ground occupied by Memphis. Moreover, the village of Busris still exists under the name of Busr, at a small distance from the pyramids; they are still a league from the river, and the small town of "Menph," formerly Memphis, is about two leagues to the southward of these monuments.

The foundation of this city is ascribed by Herodotus to Menes; and by Diodorus to Uchoreus, the eighth descendant of Osymandias. Some have proposed to reconcile these two accounts by attributing the commencement of the city to Menes, and its completion and aggrandizement to Uchoreus, who made it a royal city. The occasion of its having been erected is thus stated by Savary. After a king of Egypt had turned the course of the Nile, which lost itself in the sands of Libya, and the Delta was formed out of the mud deposited by its waters, canals were cut to drain the Lower Egypt. The monarchs who till that time had fixed their residence at Thebes, were desirous of coming nearer the mouth of the river, to enjoy a more temperate air, and to be more ready to defend the entrance of their empire. Accordingly they founded the city of Memphis, and strove to make it a rival worthy of the ancient capital. They adorned it,

as Strabo (lib. xvii.) informs us, with several temples, amongst which that of Vulcan attracted the attention of travellers, by the grandeur of the edifice and the richness of its ornaments. Another temple, no less an object of wonder, was dedicated to Serapis, the principal approach to which was adorned by prodigious sphinxes. Here was also a temple of Venus, which some have supposed to be the moon. In order to prevent the disaster which was likely to be occasioned by drifts of sand, the inundations of the river, and the attacks of an enemy, a long and lofty dyke was constructed towards the south; and on the west, it was defended by the king's palaces and a fortress erected on the mountain. On the east it was bounded by the Nile. Towards the north were lakes terminated by the plain of Mummies, and by the causeway which leads from Busris to the great pyramids. Thus situated, Memphis commanded the valley of Egypt, and communicated by canals with lake Mœris, and lake Mareotis. The citizen who inhabited it might travel from his own house all over Egypt in a boat; so that it became the centre of wealth, of commerce, and of the arts. The new capital, thus circumstanced, sunk Thebes and her 100 gates into oblivion; and the glory of Memphis lasted for many ages. It maintained its splendour till Cambyzes laid waste Egypt at the head of a formidable army. This ferocious conqueror destroyed, as far as he was able, her temples and her famous buildings; and, above all, he strove to extinguish the torch of the sciences, which the Egyptians, surrounded by waves and deserts, had lighted in their fertile valley. Memphis, however, retained so many traces of her magnificence as to be still the first city in the world. For upwards of 200 years she laboured to throw off the Persian yoke. Alexander, to whom she surrendered, amply revenged the outrages she had sustained. This conqueror, abandoning himself to a guilty delirium, removed, as Quintus Curtius informs us, within the walls of Persepolis, the horrors Cambyzes had committed at Thebes and Memphis. In process of time a city was founded which bore his name; and it was embellished by the Ptolemies, his successors. Alexandria became another Rome: the arts and sciences acquired reputation in this place: commerce also attracted hither wealth from various regions. Hence it happened, that Memphis was gradually depopulated by the migration of her inhabitants to the new and more favoured city. Under Augustus, however, it was still a great city, populous and full of strangers; though it then held the rank of only the second city of Egypt. Six hundred years after, it became the first conquest of the Arabs, who laid siege to its walls. The siege was long and bloody; but it was carried at length by storm, as Abulfeda informs us. Menf (Memphis), says this writer, is the ancient Mafr of Egypt. It is situated on the western bank of the Nile. Amrou, son of El Aas, having taken it by storm, rased it to the ground, and went to build the town of Fostat by order of Omar, son of Kettah, on the opposite side. At Menf are remarkable ruins, the remains of its ancient splendour, &c. Menf, he adds, is distant a short day's journey from Grand Cairo. The village of Menf, the sad remains of an immense city, is six leagues from Grand Cairo, on the western bank of the Nile. The lakes mentioned by Herodotus and Strabo have not entirely disappeared; one of them is near Saccara, with a wood of Acacia situated westward of Menf; the other is precisely north of it. (Savary's Letters on Egypt, vol. i.) Memphis gave name to a nome or canton of Egypt, situated on the west of the Nile, and called "Memphitis Nomos."

MEMPHITES, or *Lapis Memphiticus*, a sort of stone mentioned by Dioscorides, Pliny, and other natural his-

torians, supposed to be found in Egypt, not far from the city of Cairo, the ancient Memphis, whence its name.

The property it is famed for is, that being pulverized and smeared on any part of the body to be cut off, it deadens it so, as that the patient shall receive no pain, they say, from the operation.

MEMPHREMAGOG, in *Geography*, a lake which lies chiefly in the province of Canada, 40 miles in length from north to south, and two or three wide from east to west. The north line of Vermont state passes over the south part of the lake, in N. lat. 45°. This lake, which communicates by the river St. Francis with the river St. Lawrence, is the reservoir of three considerable streams, viz. Black, Bolton, and Clyde rivers, which rise in Vermont. The soil on its banks is rich, and the country round it is level.

MEMRAMCOOK RIVER, a river of America, which has been recommended as the most proper boundary between the province of North Brunswick and Nova Scotia. It lies a little to the eastward of Petitcodick, and pursues a north-easterly direction.

MEMRUMUS, in *Mythology*, a Phœnician deity, sprung from the race of giants, and the brother of Hypsaranus. The latter dwelt at Tyre, and invented the art of building cottages of reeds and rushes, and the papyrus; and his brother, with whom he quarrelled, taught men to clothe themselves with the skins of beasts. When an impetuous fire kindled a forest near Tyre, he took a tree, cut off its branches, and having launched it in the sea, made use of it for a ship. He also paid religious homage to two stones, which he had consecrated to the wind and fire, and poured out libations to them of the blood of certain animals. This, says Banier, is the second example of a worship paid to created beings; the sun having been the first object of idolatry. After the death of these two brothers, their children, says Sanchoniathon, consecrated to them misshapen pieces of wood and stone, which they adored, and instituted anniversary festivals to their honour. This is the first time we find religious worship performed to dead men.

MEN—*Midshipmen, Moot, Port, Quest, Sides, Twelve, Vestry* MEN. See the adjectives.

MEN, an abbreviation of the Italian adverb, *meno*, frequently used, in music, to announce a diminution; as *men forte*, less loud, &c.

MEN of *May*, in *Geography*, rocks near the north coast of Scotland; 5 miles E. from Dunnat Head. N. lat. 58° 3'. W. long. 3° 3'.

MENA, JUAN DE, in *Biography*, a Castilian poet of great celebrity, was born at Cordova about the year 1411. It was not till the age of twenty-three that he discovered any propensity towards literature; but then he made up for the time which he considered as having been lost, and betook himself most passionately to his studies, which he pursued first at Cordova, then at Salamanca, and afterwards at Rome. By his poetical talents he soon attracted a considerable degree of notice, and was patronized by several considerable persons, and by Juan II. This king, though far from respectable as to character or talents, was a lover of learning, and an encourager of it, and appointed Juan de Mena his chronicler, communicated to him materials for the history of his reign, and took delight in beholding the progress of his works. The history was never finished by de Mena; and he is chiefly known as a poet. The longest and most elaborate of his poems is entitled "El Labyrintho," commonly known by the title of "Las Trezientas," because it consists of three hundred stanzas. Mr. Southey, in the General Biography, has given a pretty full account of the plan and contents of this poem. It is said that the king ordered

dered him to add sixty-five stanzas to his poem, for this *raison*, that there might be just as many as there are days in the year. Of these, twenty-four are printed at the end of the poem. They contain some execrable flattery of Juan, and an orthodox address to the deity; the rest is declamation against the factious nobles. Juan de Mena was probably not the author of these. He has been greatly praised in this country, and has been said to unite the merits of Dante and Petrarca; but, according to Mr. Southey, the merits of Juan are exclusively what he may possess for his language: there is no glimpse of imagination, and scarcely a trace of feeling. De Mena was author of two other poems, entitled "La Coronacion," and "Tractado de Victorias y Virtudes." This last he left unfinished. There are many editions of these poems; the most complete are those of Senville in 1528, and of Antwerp in 1552. In the royal library at Madrid there is an unfinished abridgment of the Iliad, made by this author at the king's command. He died in 1456 at Tordelaguna, and was buried in the parochial church of that town. Gen. Biog.

MENA, in *Geography*, a town of Mexico, in the province of Nicaragua, on a river which runs into the lake of Nicaragua; 30 miles N.W. of St. Carlos.

MENA, in *Hindoo Mythology*, is the spouse of Himalaya, and mother of Parvati, in one of her terrestrial incarnations. The legend connected with this poetical fiction is very wild and fanciful. Himalaya, or the mansion of snow, is the Hindoo classical name of that vast chain of mountains that bounds India to the north, and embraces it with its eastern and western arms, both extending to the ocean: one named, in Sanscrit, Chandra-Sakra, or moon-crowned; and the other, which stretches westward to the mouths of the Indus, was called by the ancients Montes Parvati. The mountain Himalaya, being personified, is represented as a powerful monarch, bearing the moon as his crown, and being the source of all the good derivable from the many rivers that issue from him. These mountains were the resort of the god Siva; and his celestial consort having no children by him, became regenerated in the daughter of Himalaya and Mena, and was named Parvati, or mountain-born. In this incarnation, she, according to some legends, bore him two sons: Ganesa, the wisest of deities, the god of prudence and policy, always invoked at the beginning of every literary work; and Kartikeya, commander of the celestial armies. (See KARTIKEYA, SIVA, and PARVATI.) The name Himalaya is usually altered by European writers to Himmaleh; the range of mountains is otherwise called Hindookho. See these articles. See also MERA.

MENACES, in *Law*. See THREATS.

MENACHA, in *Geography*, a town of Arabia, in Yemen; 36 miles W.S.W. of Sanaa.

MENACHANITE, or MENAKANITE. See TITANIUM.

MENADON BAY, or *Panadon*, in *Geography*, a bay which lies two leagues from Port Balena, or Port Novo, on the coast of Cape Breton island, at the south part of the gulf of St. Lawrence, having the island of Seatair, formerly called Little Cape Breton, opposite to it.

MENAGE, GILLES, in *Biography*, a distinguished man of letters, was born at Angers in the year 1613, of which city his father was a king's advocate. Having completed his studies, he was admitted to the bar at Angers in 1632. He remained here but a short time, but went to Paris in the same year, where he pursued the legal profession, till he became disgusted with the chicanery connected with it, and adopted the ecclesiastical character, and thence gave himself up entirely to literary pursuits. He was soon distinguished among his contemporaries as a man of wit and erudition;

but by the usual freedom of his remarks on different characters with whom he associated, he was perpetually involved in quarrels. For some years he was an inmate in the house of cardinal de Retz; and when he quitted it, he took apartments in the cloister of Notre Dame, where he held weekly assemblies of the learned, to which he gave the title "Mercuriales." Menage was in easy circumstances. He had sold a small paternal estate for a life-annuity, enjoyed a considerable rent-charge upon two abbies, and obtained a royal pension, which, however, was paid but a short time. By these means he was enabled to cultivate literature in the way most agreeable to him, and to print some of his works at his own expence, which the booksellers would probably not have chosen to undertake. By a witty satire, entitled "Requête des Dictionnaires," he had precluded himself from an admission into the French academy, though it was afterwards a great object of his ambition. In the former part of his life he was distinguished by a prodigious memory; but in advanced age he experienced almost a total failure of that important faculty. Fortunately this defect was not permanent: he recovered it again, and recorded the grateful feelings of his heart in a Latin hymn to "Mnemosyne." He died at Paris in 1692, at the age of seventy-nine. His principal works are, 1. "Dictionnaire Etymologique, ou Origines de la Langue Françoise," first printed in 1650, and reprinted in 1750, with corrections and additions by M. Jault, in two volumes, folio: it is regarded as a work of much real value, though in the first editions there are numerous errors and absurd etymologies. 2. "Origines de la Langue Italienne;" in this he was assisted by several members of the academy of Della Crusca, of which he was an associate. 3. "Miscellanea," in quarto, being a collection of pieces in prose and verse, and in different languages. He also published an edition of Diogenes Laertius, with notes and illustrations; "Juris Civilis Amoenitates;" "Notes on the Poems of Malherbe;" "Histoire de Sable;" "Historia Mulierum Philosophorum," and several other pieces. Menage was an entertaining companion, by the variety of his knowledge, and the happy manner which he had of communicating it; but he was apt to be overbearing and opiniative. After his death, a "Menagiana" was compiled from notes of his conversation, anecdotes, remarks, &c. which has been several times reprinted. The last edition was published in 1715 by M. de la Monnoye, in four volumes, 12mo. Moreri.

In his admirable work, entitled "Dictionnaire Etymologique de la Langue Françoise," and in his "Origine della Lingua Italiana," curious inquirers after the musical language of the middle ages will find more information than in any other Lexicons or philosophical works with which we are acquainted, except in the Glossarium of Ducange.

MENAGE, *Fr.*, denotes a collection of animals; whence we have derived the word *menagery*.

MENAGE, in *Geography*, an island in the river Senegal.

MENAGIO, a town of Italy, in the department of the Lario; 15 miles N.N.E. of Como.

MENAI, a channel between the island of Anglesey and the county of Caernarvon.

MENAIIS, in *Botany*, perhaps from *μῆναι*, to stand undaunted against the attacks of an enemy, because this shrub is, as its specific name *topiaria* expresses, able to bear clipping, and plating into bowers. No explanation of the name having been given, we offer the best that occurs to us. Linn. Gen. 95. Schreb. 130. Willd. Sp. Pl. v. 1. 997. Loefl. It. 306. Juss. 128. Lamarek Dict. v. 4. 90.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asperifoliae*. Linn. *Borragineae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of three lax, concave, small,

small, pointed, striated, permanent leaves. *Cor.* of one petal, falver-shaped; tube cylindrical, longer than the calyx; limb spreading, in five deep rounded segments. *Stam.* Filaments five, very short; anthers awl-shaped, in the mouth of the corolla. *Pist.* Germen superior, roundish, depressed; style thread-shaped, erect, the length of the tube; stigmas two, oblong, acute. *Peric.* Berry globose, of four cells. *Seeds* solitary, nearly ovate, acute at one end.

Eff. Ch. Corolla falver-shaped. Calyx of three leaves. Berry of four cells. Seeds solitary.

1. *M. topiaria.* Bower Menais. Linn. Sp. Pl. 251.—Native of South America. A *shrub*, with round, somewhat hairy stems. Leaves alternate, ovate, undivided, rough. We have seen no figure nor specimen of this plant. Linnæus mentions Aymen as the author of the genus. Justifieu suspects it not to be different from *Ehretia*, to which we have chiefly to object the three-leaved calyx. See *EHRETIA*.

MENAKA, the name of a semi-divine female, in the Puranic romances of the Hindoos, frequently alluded to in their writings and conversation, proverbially, as highly beautiful and fascinating. When the evil counsellor Indra, (see *INDRA*), jealous of the growing sanctity of the ascetic Viswamitra (which see), resolved to counteract his meritorious penance, he thought female blandishment the readiest mode of debauching the faint; and selected Menaka, as a promising instrument through whom to effect his unholy purpose. The moral legend is thus alluded to in the 50th section of the first book of the Ramayana. (See that article.) "When the sanctified ascetic Viswamitra, who had for thousands of years been engaged in the most rigid mortifications, beheld Menaka the Apsara, sent by Indra to debauch him, bathing, of surprising form, unparalleled in beauty, in appearance resembling Sri (see *SRI*), her clothes wetted by the stream, exhibiting her fascinating symmetry of frame; he, subdued by the arrows of Kandarpa (see *KANDARPA*), approached her; and five times five years, spent in dalliance with this seducing female, passed away like a moment. What!—exclaimed at length the reflecting sage,—my wisdom, my austerities, my firm resolution, all destroyed at once by a woman! Seduced by the crime in which Indra delights, am I stripped of the advantages arising from all my austerities!" In this manner we occasionally find sound morality inculcated by the wild fables of the Hindoos. If we object to the warmth of language sometimes observable in such writings, we should recollect that in fairness we ought not to estimate them by any standard of European criticism; but should advert to the usages of the people, the times, and the countries, for whom and wherein they were promulgated.

MENALD DEER, a species of the common fallow-deer, beautifully variegated.

MENAMAN, in *Geography*, a town of Asiatic Turkey, in Natolia, situated on the north coast of the gulf of Smyrna; 6 miles N.W. of Smyrna.

MENANDER, in *Biography*, the most celebrated of the Greek comic poets, was born at Athens in the year 342 B.C. He is considered as the person who introduced the new comedy, which refined upon the grossness and licence of the old, and banished living characters from the stage. He is represented as possessing every part of a perfect dramatic writer, *viz.* elegance of language, force and delicacy of sentiment, and the true and humorous delineation of character. He was so much the poet of nature, that the grammarian Aristophanes once exclaimed, "O Menander and Nature, which of you copied from the workmanship of the other!" Quintilian praises him for the strength and consistency displayed in the characters of his dramas. Ovid predicts that the fame of Menander would be immortal.

His fame extended as far as the Greek language; and we are informed by the elder Pliny, that the kings of Egypt and Macedonia gave him pressing invitations to their courts, and even offered fleets for his safe conveyance. He preferred, however, a life of freedom in his native city; yet he could not be accounted a moral philosopher. By Plutarch he is called "the chief priest of Love;" and Suidas gives him the character of one "mad after women." Phædrus paints him as paying his compliments to Demetrius Phalereus at Athens, perfumed all over, with a flowing garment, and advancing with an affected and languid step. He composed 108 comedies, eight of which obtained the theatrical prize. It is extraordinary that, of an author so much esteemed as Menander was, nothing has come down to our time except some fragments, chiefly of the sentimental kind, and generally of a gloomy and querulous tenour, which perhaps were characteristic only of the persons into whose mouth they were put: and what remains of him does not mark so strongly his own peculiar genius, as the taste of those selectors who have chosen his words to illustrate their own ideas. Thus, to the melancholy selector we owe the survival of the sad and peevish complaints on the many sorrows to which flesh is the natural heir. On the other hand, the strikingly moral passages with which his works abounded alone caught the attention of the fathers of the primitive church, who found in the Greek comedian a strain of piety so nearly approaching to their own faith and feelings, that all ideas of a preponderance of satire over moral precept must yield to evidence so irresistible as the approbation of Clemens Alexandrinus and Eusebius. It is from these two sources alone, the writings of the melancholy and pious man, that we are furnished with our specimens of Menander. Happy had it been for us and the world, had the gay and the witty finished the portrait of the bard, by transmitting to after-ages examples that would have enabled us to measure him by the standards of humour, sprightliness, and fancy. The superiority of the Grecian dramatist was felt and acknowledged by Roman imitators; and Cicero frequently reprobates the prevailing partiality of his countrymen for such foreign authors. Menander was drowned in the harbour of Piræus, in the year B.C. 293, at a period of his life when he had done enough to obtain immortality, and while the powers of his mind were unimpaired by age, and his genius sufficiently ardent to do still more. He is said to have thrown himself into the sea in a fit of jealousy, occasioned by his unfortunate competition with Philemon. He was vanquished, as Aulus Gellius asserts, by the superior interest rather than talents of his successful rival; and the same writer relates, that, meeting him shortly after the contest had been decided, he asked him, "If he did not blush at gaining the prize against him?" The fragments of Menander have been several times reprinted. The most complete edition is that of Le Clerc in 1709. To this, on account of many mistakes in prosody, Bentley, in 1713, gave his "Emendationes in Menandri et Philemonis Reliquias." Monthly Mag.

MENANDRIANS, in *Ecclesiastical History*, the most ancient branch of Gnostics; thus called from Menander their chief, said by some, without sufficient foundation, to have been a disciple of Simon Magus, and himself a reputed magician.

He taught, that no person could be saved, unless he were baptised in his name: and he conferred a particular sort of baptism, which would render those who received it immortal in the next world; exhibiting himself to the world, with the phrensy of a lunatic more than the founder of a sect, as a promised favour. For it appears by the testimonies of Irenæus, Justin, and Tertullian, that he pretended to be one of the

the Æons sent from the pleroma, or ecclesiastical region, to succour the souls that lay groaning under bodily oppression and servitude; and to maintain them against the violence and stratagems of the demons that hold the reins of empire in this sublunary world. As this doctrine was built upon the same foundation with that of Simon Magus, the ancient writers looked upon him as the instructor of Menander. See SIMONIANS.

MENAN-TAN, in *Geography*, a town of Siam; 6 miles N. of Portelon.

MENANGAEBOW, a kingdom of Sumatra, being the principal sovereignty of the island, which formerly comprehended the whole, and still receives a shadow of homage from the most powerful of the other kingdoms, that have sprung up from its ruins. This kingdom is the principal seat of empire of the Malays, and of the whole island. It lies near the centre, extending partly to the northward, but chiefly to the southward of the equinoctial, about 60 or 100 miles. The country is, generally speaking, a large plain, bounded by hills, clear of woods, and, comparatively, well cultivated. It has an easy communication with both sides of the island, lying nearer to the western coast, but having the advantage, to the east, of the large rivers Racan, Indergerce, Siak, Jambee, and even Palembang, with which it is said to have connection by means of a large lake, that gives source to the two last, as well as to the river of Cat-town on the opposite side. Colonies of Malays from Menangeabow are settled on several branches of Janbee river, or rather those small rivers which run into it. Here they collect large quantities of gold. The name of Menangeabow is said to be derived from the words "menarg," to win, and "carbow," a buffalo; from a story, which bears a very fabulous air, of a famous engagement on that spot between the buffalos and tigers, in which the former are reported to have gained a complete victory. The actual power and resources of the sultan are, at this day, scarcely superior to those of a common raja; yet he still asserts all his ancient rights and prerogatives, which are not disputed, as long as he refrains from attempting to carry them into force. His character is held in a sacred light, and the obscurity and air of mystery which surround his court, together with the influence of the Mahometan priests, who regard him as the head of their religion, keep up this veneration. This empire is allowed to be very ancient; though when the Europeans first made discoveries in these parts, it was in its decline. Like the other people of Sumatra, those of Menangeabow are entirely without records or annals. They are expert at writing in the Arabic character; but their literature amounts to nothing more than transcripts of the Koran, and "cabar," or historic tales, resembling our old romances, but having less ingenuity. They are famous for composing songs, called "pantoon," which spread throughout the island. The arts, in general, are carried among them to a greater degree of perfection than by the other natives of Sumatra. The Malays are the sole fabricators of the gold and silver *filagree*; which see. Menangeabow has also been celebrated for its considerable traffic in gold, lying in the midst of the mines, where it is chiefly produced. Much cloth is wrought in, and exported from it. Here also have been manufactured, from the earliest times, arms for their own use, and for the supply of the northern inhabitants of the island, who are the most warlike. Their guns are those pieces called matchlocks, nor is the improvement of springs and flints yet adopted by them; their barrels are well tempered, and of the justest bore. Powder is made by them in great quantity, but it is defective in strength. Besides guns, they have other arms, which

me, for the most part, weapons of a make between that of a scimitar and a knife. Their crosses are a species of dagger of a particular construction, and are worn by all descriptions of people. They have other implements of warfare, called "Ranjow," which are sharp-pointed blades of bamboo, of different lengths, stuck into the ground, in order to penetrate the naked feet or body of an enemy. They are made use of in cases of flight, to annoy and retard the pursuers, and planted in the path-ways, or among the long grass, by the vanquished party as they run. They are also disposed in the approaches to fortified divisions. Their wars are generally carried on rather in the way of ambuscade, and surprise of straggling parties, than open combat. The soldiers have no pay, but the plunder is thrown into a common fund, and divided.

The people of Menarg abow are all Mahometan, and in that respect distinguished from the other island inhabitants of the island. This country is looked upon as the supreme seat of that religion; and next to a voyage to Mecca, which some Sumatrans have undertaken, to have been at Menangeabow stamps a man learned and of superior sanctity. With the change of their religion, the people of this country altered their language, laws, custom, and manners. This was effected by the settlement of the Malays among them.

By late accounts it appears, that the kingdom of Menangeabow, even in its limited state, is rent into various sovereignties. Marsden's Sumatra.

MENAPII, in *Ancient Geography*, a people who, in the time of Cæsar, inhabited the banks of the Lower Rhine. They were bounded on the N. and E. by the Mosæ, and on the W. by the Scaldis. Their country corresponded to Brabant.

MENARD, LEON, in *Biography*, an historical writer, was born at Tarascon in 1700. It is imagined he was educated for the legal profession, though he certainly did not pursue it to any great extent, but devoted most of his time and talents to the study of history and antiquities. He obtained a place in the Academy of Inscriptions and Belles Lettres, and from that time passed his life chiefly at Paris, where he died in indigent circumstances in 1767. His principal works are, "A History of the Bishops of Nismes," in two vols. 12mo.: "L'Histoire civile ecclesiastique et litteraire de la Ville de Nismes," which consisted of seven volumes 4to., and was the product of many laborious years. In depth of research, and abundance of curious matter, this is said to be surpassed by few topographical works. As a relaxation from more serious labours, he composed a romance, entitled "Les Amours de Calisthene et d'Aristo-clie:" the scene is laid in Ancient Greece, and it consists in the delineation of Grecian manners, which subject is expressly treated on in another work of our author, entitled "Mœurs et Usages des Grecs," which was very much read, and proved honourable to his industry and learning. He next carried his researches into French history, and published, as the result of his labours, a collection of "Pieces fugitives pour servir a l'Histoire de la France," in three vols. 4to. Another, and probably his last publication, was entitled "A Refutation of the Arguments of Voltaire against the Authenticity of the Political Testament of Cardinal Richelieu." Gen. Biog.

MENARUOLO, in *Geography*, a town of Italy; 17 miles N.W. of Verona.

MENAS, Sr., an island in the Grecian Archipelago, about six miles in circumference. N. lat. 37° 33'. E. long. 26° 30'.

MENASSEH, BEN ISRAEL, in *Biography*, a celebrated rabbi, who flourished in the seventeenth century, was a na-

tive of Spain, and born very early in that century. His father, after having been cruelly tortured by the Spanish Inquisition, and stripped of his property, escaped into Holland with his wife and sons, of whom Ben Israel, the subject of this article, was one. Here he was placed under a learned preceptor, Isaac Ufeli, and pursued his studies with such diligence and success, that at the age of eighteen he was so deeply skilled in Hebrew and theology, that he was judged fully qualified to succeed his tutor as preacher and expounder of the Talmud in the synagogue of Amsterdam, a post which he occupied with high reputation for many years. He was not quite twenty-eight years of age, when he published in the Spanish language the first part of his work entitled "Conciliador:" of which was published a Latin version, in the following year, by Dionysius Vossius, entitled "Conciliator, sive de Convenientia Locorum S. Scripturæ, quæ pugnare inter se videntur, Opus ex Vetus et Recentioribus omnibus Rabbini magna Industria ac Fide congestum." This work shews that its author had a profound and intimate acquaintance with the Old Testament writings, and it procured for him the esteem and admiration of all the learned, as well Christians as Jews. It was recommended to the notice of biblical scholars by the learned Grotius.

Notwithstanding the learning and diligence of our rabbi, he found that the expences of a large and growing family could not be defrayed by the salary attached to his appointment, and engaged in the mercantile line of business; and he also set up a printing-press in his own house, at which he printed three editions of the Hebrew bible, and a number of other books. Under the protectorate of Cromwell, he came over to England, in order to solicit leave for the settlement of the Jews in this country. Here he met with a favourable reception from the protector and his parliament, and succeeded in obtaining greater and more important privileges for his nation than they had ever enjoyed before in this country, and in 1656 published an "Apology for the Jews," in the English language. This piece was afterwards published in the second volume of the collection of scarce and curious tracts entitled "The Phoenix," &c. Menasseh died at Amsterdam about the year 1659, and left a son, who inherited his printing-press, busily employed in printing some of his father's works. The rabbi was respected and esteemed as well for his moral virtues as for his great learning, and had been long in habits of correspondence and intercourse with some of the most learned men of his time, among whom were the Voffii, Episcopius, and Grotius. The following are his principal works independently of that already noticed: 1. An Edition of the Hebrew Bible, two vols. 4to.: 2. The Talmud corrected, with Notes: 3. De Resurrectione Mortuorum: and 4. Spes Israelis, dedicated to the parliament of England in the year 1650; it was originally published in Spanish, and afterwards translated into the Hebrew, German, and English, one object of which is to prove that the ten tribes are settled in America. He was author likewise of numerous other pieces. Moreri. Universal History.

MENAT, in *Geography*, a town of France, in the department of Puy-de-Dôme, and chief place of a canton, in the district of Riom; 24 miles N.N.W. of Riom. The place contains 1748, and the canton 10,014 inhabitants, on a territory of 180 kilometres, in 11 communes.

MENCKE, LEWIS OTHO, in *Biography*, was born in 1644, at Oldenburg, in Westphalia, of which city his father was a senator, and also in trade. After studying at and visiting several of the universities in Germany and Holland, he was appointed professor of moral philosophy at Leipzig in 1668,

He was, in the course of an active and well spent life, five times rector of the university, and occupied his post as professor till his death, in 1707. He was editor of several learned works, and was the planner of the periodical work called the Leipzig Journal, but better known by the name "Acta Eruditorum," of which, with the assistance of other learned men, he published thirty volumes. Moreri.

MENCKE, JOHN BURCHARD, son of the preceding, was born at Leipzig in 1674, and in 1699 we find him appointed to the professorship of history, an office in which he acquired a high reputation by his lectures. He was also historiographer and aulic counsellor to Frederic Augustus of Saxony, king of Poland; a member of the Academy of Berlin, and of the Royal Society of London. He died at Leipzig in 1732, leaving behind him several very learned and useful publications on historical and philosophical subjects. One of the most remarkable of these consisted of two Latin declamations, "De Charlataneria Eruditorum," which were translated into various languages. He had a large share in, and was the original projector of a German "Dictionary of Learned Men," but his chief undertaking was a collection of the German historians, under the title of "Scriptores rerum Germanicarum, speciatim Saxonicarum," in three volumes folio. He published an enlarged edition of Lenglet's "Methode pour etudier l'Histoire avec un Catalogue des principaux Historiens," and after the death of his father, he continued the Leipzig journal to thirty-three volumes more. Moreri.

MEND, in *Geography*, a town of Persia, in the province of Mekran, at the union of the Mekshid and the Nehenk, which hence take the name of Mend, and run into the Indian sea. The town is distant 40 miles S.W. from Kidge. N. lat. 25° 50'. E. long. 63° 30'.

MENDÆANS, in *Eccelesiastical History*. See HEMERO-BAPTISTS.

MENDAMA, in *Geography*, a town of the island of Ceylon; 18 miles N. of Candi.

MENDAVIA, a town of Spain, in Navarre; 8 miles E.S.E. of Viana.

MENDE, a town of France, and principal place of a district, in the department of the Lozère: situated on an eminence, near the Lot; before the revolution the see of a bishop; 49 miles W. of Privas. The place contains 5014, and the canton 10,610 inhabitants, on a territory of 305 kilometres, in ten communes. N. lat. 44° 31'. E. long. 3° 34'.

MENDELI, a fortified town of the Arabian Irak, on the frontiers of Persia; 50 miles N.E. of Bagdad. N. lat. 33° 54'. E. long. 45°.

MENDELSON, MOSES, in *Biography*, a Jewish philosopher, and elegant writer in the last century, was born at Dessau, in Anhalt, in the year 1729. His father was a schoolmaster, and undertook the education of his son. He was brought up to business, but devoted every hour he could claim as his own to literature, in which he greatly excelled, and obtained as a scholar a distinguished reputation; but it was, unfortunately, at the expence of his health. He was also destined to a state of extreme penury: at the age of fourteen, he travelled on foot to Berlin, where he lived in indigence and obscurity, and frequently in want of the necessaries of life. At length he got employment from a rabbi as a transcriber of MSS., who, at the same time that he afforded him the means of subsistence, liberally initiated him into the mysteries of the theology, the jurisprudence, and scholastic philosophy of the Jews. The study of philosophy and general literature became from this time his favourite pursuit, but the fervours of application to learning were by degrees alleviated and animated by the consolations

tions of literary friendship. He formed a strict intimacy with Israel Moses, a Polish Jew, who, without any advantages of education, had become an able, though self-taught, mathematician and naturalist. He very readily undertook the office of instructor of Mendelsohn, in subjects of which he was before ignorant, and taught him the Elements of Euclid from his own Hebrew version. "The singular spectacle of the two youthful rabbies, circumstanced as they were, sitting in the corner of retired streets, the one with a Hebrew Euclid, instructing the other, who was hereafter to be classed among the most eminent literati of his country, may instruct the young and the indigent, that the cold touch of poverty can never paralyse the sublime efforts of resolute genius." The intercourse between these young men was not of long duration, owing to the calumnies propagated against Israel Moses, which occasioned his expulsion from the communion of the orthodox; in consequence of this, he became the victim of a gloomy melancholy and despondence, which terminated in a premature death. His loss, which was a grievous affliction to Mendelsohn, was in some measure supplied by Dr. Kisch, a Jewish physician, by whose assistance he was enabled to attain a competent knowledge of the Latin language. In 1748 he became acquainted with another literary Jew, *viz.* Dr. Solomon Gumperts, by whose encouragement and assistance he attained a general knowledge of the living and modern languages, and particularly the English, by which he was enabled to read the great work of our immortal Locke in his own idiom, which he had before studied through the medium of the Latin language. About the same period he enrolled the celebrated Lessing among his friends, to whom he was likewise indebted for assistance in his literary pursuits. The scholar amply repaid the efforts of his instructor, and soon became his rival and his associate, and after his death the defender of his reputation, even at the expence of his own life: for when Lessing was charged with Atheism by M. Jacobi, a German writer, he roused all his powers in his justification, and entered so vehemently into the controversy, as to exhaust an already feeble and delicate frame: his whole nervous system became so completely deranged, that severe study, for a short time only, produced fainting fits. To avoid these, when he found them approaching, Mendelsohn would instantly abandon what he was about, and banish all thought from his mind. Being asked how he contrived to exult without thinking, and exercising the powers of reflection, he replied, "I retire to the window and count the tiles upon the roof of my neighbour's house." He died at the age of fifty-seven, highly respected and beloved by a numerous acquaintance, and by persons of very different opinions. When his remains were consigned to the grave, he received those honours from his nation which are commonly paid to their chief rabbies. As an author, the first piece was published in 1755, entitled "Jerusalem," in which he maintains that the Jews have a revealed law, but not a revealed religion, but that the religion of the Jewish nation is that of nature. His work entitled "Phædon, a Dialogue on the Immortality of the Soul," in the manner of Plato, gained him much honour: in this he presents the reader with all the arguments of modern philosophy, stated with great force and perspicuity, and recommended by the charms of elegant writing. From the reputation which he obtained by this masterly performance, he was entitled by various periodical writers the "Jewish Socrates." It was translated into French in 1773, and into the English in 1789. Among his other works, which are all creditable to his talents, he wrote "Philosophical Pieces;" "A Commentary on Part of the Old Testament;" "Letters on the Sensation of the Beautiful." Gen. Biog.

MENDEN, in *Geography*, a town of Westphalia; 47 miles N. E. of Cologne.

MENDES, or MYNDES, a town of Asiatic Turkey, in Natolia, in a bay of the Archipelago; anciently called "Myndus," 20 miles S. of Mileta. N. lat. 33° 5'. E. long. 27° 10'.

MENDES, in *Ancient Geography*, a town of Egypt, near the mouth of one of the eastern branches of the Nile, between Schennytus to the west, and Tanés to the east. The arm of the Nile on which it was seated was denominated the *Mendesian*. This ancient city was famous for its temples, and the indecency of the worship paid there to the ram. When the sacred animal dies, the Mendesian province solemnizes his death by a general mourning. Herodotus, lib. ii. *Euterpe*.

MENDES, in *Mythology*, an Egyptian deity, who was worshipped as the emblem of the sun. The Egyptians having discovered that they owed the fertility of their country to the influence of the sun, worshipped him under the name of Mendes, which signifies "very fruitful." Accordingly they consecrated the goat to him, as the most prolific of all animals. This animal was fed in the temple of Mendes, as the living image of the God whom he represented. The Greeks gave to Mendes the name of *Pan*; which see.

MENDESCAO, in *Geography*, a town of Naples, in Calabria Citra; 3 miles W. of Cosenza.

MENDEZ, MOSES, in *Biography*, an English poet and dramatic writer, who flourished in the last century, and died about the year 1758. He was of Jewish extraction, though he had abandoned the religion of his fathers. He was author of several poems in Doddsley's Collections.

MENDHAM, in *Geography*, a township of America, in Morris county, New Jersey; six miles W. of Morristown.

MENDICANTI, the title of one of the music schools at Venice for girls, known by the name of conservatorios. The maestro di capella of the hospital de Mendicanti, in 1770, was the worthy Bertoni, by whose favour we were admitted into the interior of this admirable seminary, to an extra concert of two hours, by the best vocal and instrumental performers of this hospital: it was really curious to see, as well as to hear every part of this excellent concert, performed by females, violins, tenors, basses, harpsichord, French horns, and even double basses; and there was a prioress, a person in years, who presided: the first violin was very well played by Antonia Cubli, of Greek extraction; the harpsichord sometimes by Francesca Rossi, maestra del coro, and sometimes by others: these young persons frequently change instruments. The singing was truly excellent in different styles; and the whole was very judiciously mixed; no two airs of a sort followed each other, and there seemed to be great decorum and good discipline observed in every particular; for these admirable performers, who are of different ages, all behaved with great propriety, and seemed to be well educated. It was here that the two celebrated female performers, the Archiapate, afterwards signora Guglielmi, and signora Maddalena Lombardini, afterwards madame Sirman, who received such great and just applause in England, had their musical instructions.

MENDICANTS, BEGGARS, a term applied to several orders of religious, who live on alms and go a begging from door to door.

The religious society distinguished by this appellation surpassed all the rest in the purity of its manners, the extent of its fame, the number of its privileges, and the multitude of its members. Its order was first established in the 13th century, and the members of it, by the tenor of

their institution, were to remain entirely destitute of all fixed revenues and possessions; though in process of time their number became a heavy tax upon the people. Innocent III. was the first of the popes who perceived the necessity of instituting such an order, and accordingly he gave such monastic societies, as made a profession of poverty, the most distinguishing marks of his protection and favour. They were also encouraged and patronized by the succeeding pontiffs, when experience had demonstrated their public and extensive usefulness. But when it became generally known, that they had such a peculiar place in the esteem and protection of the rulers of the church, their number grew to such an enormous and unwieldy multitude, and swarmed so prodigiously in all the European provinces, that they became a burthen, not only to the people, but to the church itself. The great inconvenience that arose from the excessive multiplication of the Mendicant orders was remedied by Gregory X. in a general council, which he assembled at Lyons, in 1272. For here all the religious orders, that had sprung up after the council held at Rome, in 1215, under the pontificate of Innocent III. were suppressed; and the extravagant multitude of Mendicants, as Gregory called them, was reduced to a smaller number, and confined to the four following societies or denominations, *viz.* the Dominicans, the Franciscans, the Carmelites, and the Augustines, or the hermits of St. Augustine.

As the pontiffs allowed these four Mendicant orders the liberty of travelling wherever they thought proper, of conversing with persons of every rank, of instructing the youth and multitude wherever they went; and as these monks exhibited, in their outward appearance and manner of life, more striking marks of gravity and holiness than were observable in the other monastic societies, they arose all at once to the very summit of fame, and were regarded with the utmost esteem and veneration through all the countries of Europe. The enthusiastic attachment to these sanctimonious beggars went so far, that, as we learn from the most authentic records, several cities were divided, or cantoned, into four parts, with a view to these four orders; the first part being assigned to the Dominicans, the second to the Franciscans, the third to the Carmelites, and the fourth to the Augustinians. The people were unwilling to receive the sacrament from any other hands than those of the Mendicants, to whose churches they crowded to perform their devotions, while living, and were extremely desirous to deposit there also their remains, after death; nor did the influence and credit of the Mendicants end here; for we find in the history of this, and of the succeeding ages, that they were employed, not only in spiritual matters, but also in temporal and political affairs of the greatest consequence, in composing the differences of princes, concluding treaties of peace, concerting alliances, presiding in cabinet councils, governing courts, levying taxes, and other occupations, not only remote from, but absolutely inconsistent with, the monastic character and profession. However, the power of the Dominicans and Franciscans greatly surpassed that of the other two orders; inasmuch that these two orders were, before the Reformation, what the Jesuits have been since that happy and glorious period, the very soul of the hierarchy, the engines of the state, the secret springs of all the motions of the one and the other, and the authors and directors of every great and important event, both in the religious and political world. By very quick progression their pride and confidence arrived at such a pitch, that they had the presumption to declare publicly, that they had a divine impulse and commission to illustrate and maintain the religion of Jesus; they treated with the

utmost insolence and contempt all the different orders of the priesthood; they affirmed, without a blush, that the true method of obtaining salvation was revealed to them alone; proclaimed, with ostentation, the superior efficacy and virtue of their indulgences; and vaunted, beyond measure, their interest at the court of heaven, and their familiar connections with the Supreme Being, the Virgin Mary, and the saints in glory. By these impious wiles, they so deluded and captivated the miserable and blinded multitude, that they would not entrust any other but the Mendicants with the care of their souls. They retained their credit and influence to such a degree, towards the close of the 14th century, that great numbers of both sexes, some in health, others in a state of infirmity, and others at the point of death, earnestly desired to be admitted into the Mendicant order, which they looked upon as a sure and infallible method of rendering heaven propitious. Many made it an essential part of their last wills, that their bodies after death should be wrapped in old ragged Dominican or Franciscan habits, and interred among the Mendicants. For such were the barbarous superstition and wretched ignorance of this age, that people universally believed, they should readily obtain mercy from Christ, at the day of judgment, if they appeared before his tribunal associated with the Mendicant friars.

About this time, however, they fell under an universal odium; but being resolutely protected against all opposition, whether open or secret, by the popes, who regarded them as their best friends, and most effectual supports, they suffered little or nothing from the efforts of their numerous adversaries. In the 15th century, besides their arrogance, which was excessive, a quarrelsome and litigious spirit prevailed among them, and drew upon them justly the displeasure and indignation of many. By affording refuge, at this time, to the Beguins in their order, they became offensive to the bishops, and were hereby involved in difficulties and perplexities of various kinds. They lost their credit in the 16th century by their ruttic impudence, their ridiculous superstitions, their ignorance, cruelty, and brutish manners. They discovered the most barbarous aversion to the arts and sciences, and expressed a like abhorrence of certain eminent and learned men, who endeavoured to open the paths of science to the pursuits of the studious youth, recommended the culture of the mind, and attacked the barbarism of the age in their writings and discourse. Their general character, together with other circumstances, concurred to render a reformation desirable, and to accomplish this happy event. Mosheim's *Ecl. Hist.* vol. iii. passim.

Among the number of Mendicants are also ranked the Capuchins, Recollects, Minims, and others, who are branches or derivations from the former.

MENDING, in *Agriculture*, a term used to signify the improving of land by means of manure.

MENDIP HILLS, in *Geography*, a range of hills, in the county of Somerset, near the city of Wells; celebrated for mines of lead and coals.

MENDLING, a town of Austria, on a river of the same name, which runs into the Salza, near Keisling, in Stiria; the town is 15 miles distant S.S.E. from Bavarian Waidhoven.

MENDOCINO CAPE, a cape of North America, on the coast of New Albion; off the cape lie some rocky islets and sunken rocks, about a league from the shore. This cape is rendered remarkable by being the highest on the sea-shore of this part of New Albion. The mountains behind it are elevated and break into separate hills, rising abruptly

abruptly and divided by many deep chasms. On both the hills and chasms are some few dwarf trees. The general surface exhibits vegetables of a dull green colour, inter-ferted with perpendicular strata of red earth or clay. N. lat. 40° 40'. E. long. 135° 53'.

MENDOLCIA, a town of Naples, in Calabria Citra; three miles W. of Bovio.

MENDON, a post-town of America, in Worcester county, Massachusetts; 37 miles S.W. of Boston. The township, called "Quaupungua" by the Indians, was incorporated in 1667, and contains two congregational parishes, a society of Friends, and 1608 inhabitants. On the S. it is bounded by the state of Rhode Island; and it is watered by the Charles and Mills rivers, and other streams, which turn several mills.

MENDOW, a town of Hindoostan, in Guzerat; 33 miles E. of Amedabad.

MENDOZA, DON INIGO LOPEZ DE, SENOR DE UREA Y BVRVITAGO, first marques de Santoluna, and Conde del Real de Manzanares, in *Biography*, was born in August 1398; he married in 1418 Dona Catalina de Figueroa, and died in 1458. During the reign of Juan II. his courage was conspicuous, and his prudence still more so, as he aggrandized himself without injuring his reputation. He is mentioned not only as a contributor to the literature of his own country, but as an early patron of it. His works are as follow: 1. Maxims of morality in verse, written by desire of Juan II. for the instruction of his son Henrique. This book has passed through ten editions at least, and is still reckoned one of the rarest in that language. 2. Proverbs which old women repeat by the fire-side: this is supposed to be the oldest collection of proverbs in any modern language. 3. A letter addressed to D. Pedro, son of the Infante D. Pedro of Portugal. This letter, which the marques sent with a collection of his own poems, is regarded as one of the most valuable documents for the literary history of Spain, as containing an account of all the Spanish poets, whose works the writer had either seen or heard of. Besides these, many of the marques' poems are in the "Cancionero General," and others in MSS.: among them is a poem upon the "Creation," consisting of 333 stanzas, in the same metre as the "Trezientas" of MENA, which see. He first introduced the sonnet into Spanish poetry.

MENDOZA, D. DIEGO HURTADO DE, son of Lopez de Mendoza, first marques de Mondejar, was born at Granada about 1505, and there, during his childhood, he acquired a practical knowledge of Arabic, which he continued to cultivate through life. He studied the Greek language very successfully at Salamanca, and was a soldier in the Italian wars. While engaged in the military service, he spent every winter, while the troops were inactive and in quarters, at Rome, or Padua, or some other Italian university, where he could enjoy and profit by the society of learned men. He was employed as ambassador by Charles V. in the most important transaction of his whole reign, at the council of Trent, at Venice, and at the papal court. At Venice he exerted himself to recover Greek MSS. He obtained many of the writings of St. Basil the Great, and of Gregory Nazianzen, the works of Cyril of Alexandria, and the more valuable remains of Archimedes, of Hero and of Applan: all these, with copies also of cardinal Bessarion's and of other collections, he left to the Escurial library. Don Diego was superseded at Rome in 1551 to satisfy the papal court. He continued some years one of Philip's counsellors, but was at length banished from his court. He retired to Granada, and there upon the spot composed his history of the war against the Moriscoes:

he has amused himself with literature during the remainder of his life. In 1574 he obtained leave to return to Madrid, and died in a few days after his arrival. None of his works were published during his lifetime. In 1615 a volume of his poems was collected by J. D. Hidalgo, the king's chaplain, who suppressed the coarse and lascivious poems, which were numerous. His history of the Moriscoes was published the same year by Luis Tribullus; part of the third book having been lost, was supplied by the count de Portalegre, D. Joan de Silva. It has been reprinted several times, and is reckoned the very best specimen of historical composition in the Spanish language. The story of Lazzarillo de Tormes, which has been translated into almost every European tongue, is attributed to this author as a youthful work, written at Salamanca. Others impute it to Juan de Ortega. Gen. Biog.

MENDOZA, PETER GONZALEZ DE, a Spanish cardinal, and archbishop of Toledo, was born in 1428. He acquired his high preferments in the church by his talents as a statesman. Pope Sixtus IV. made him cardinal. He died in 1495: as a literary man he is said to have translated the Iliad and Æneid, also Sallust, into the Spanish. Another person of the same name, an Augustine friar, was sent by the king of Spain as ambassador to the emperor of China in 1584. After obtaining several instances of preferment, he was appointed, in 1608, bishop of Popayan in the West Indies. He is known as an author by a history of China, written in the Spanish language. Moreri.

MENDOZA, in *Geography*, a jurisdiction of Chili, in South America, subject to the vice-royalty of Buenos Ayres. It has a town of the same name, which lies on the E. side of the Cordilleras, about 50 leagues from Santiago. It is situated on a plain, adorned with gardens, and supplied with water by means of canals. The town contains about 100 families, half Spaniards and half Indians, together with a college founded by the Jesuits, a parochial church, and three convents. This jurisdiction comprehends also the towns of St. Juan de la Frontera, on the E. of the Cordilleras, and about 30 leagues N. of Mendoza, and St. Louis de Loyola, about 50 miles E. of Mendoza; the latter is small, but has a parish church, a Dominican convent, and a college founded by the Jesuits. S. lat. 33° 25'. W. long. 69° 47'.

MENDOZA, a river which rises in the Cordilleras of the Andes; over which is a natural bridge of rocks, from the vaults of which hang icicles, formed of the water as it drops from the rocks. The bridge is broad enough to admit of three or four carts abreast. Near it is another bridge, called the bridge of the Incas, betwixt two rocks, and elevated a great height from the river.

MENDRA, a small island in the Indian sea, near the coast of Africa. S. lat. 2° 15'.

MENDRAH, a town of Fezzan, in a district or province of the same name, nearly S. from Mourzouk, and distant from it about 60 miles. Although much of the land is a continued level of hard and barren soil, the quantity of "Troua," a species of fossil alkali that floats on the surface, or settles on the banks of its numerous smoking lakes, has given it a higher importance than that of the most fertile districts. Of this valuable produce, great quantities are annually brought by the merchants of Fezzan to Tripoli, from whence it is shipped for Turkey and Tunis, and the dominions of the emperor of Morocco. The people of the latter employ it as an ingredient in the dye of the leather, for which they are famous, and in that of the woollen caps that are worn by the Arabs and the Moors as the basis

of their turbans. Proceedings of the African Association, &c. 1790.

MENDRISIO, or **MENDRIS**, a small well-built market-town of Italy, in the department of the Verbano, late the capital of a small bailiwick of the same name, lying between the lakes of Como and Lugano, which is extremely fertile, and contains 19 parishes, and about 16,000 inhabitants. The town is about 26 miles N.N.W. of Milan, and 7 miles from Como. N. lat. $45^{\circ} 45'$. E. long. $9^{\circ} 0'$.

MENDURAGU, a town of Russia, in the government of Viburg, on the borders of Finland; 48 miles W.N.W. of Velmanstrand.

MENEDEMUS, in *Biography*, a Greek philosopher, who flourished towards the close of the fourth century before Christ, was a native of Eretria, in the island of Eubœa. He was of the *ELIAC School* (which see), which he afterwards transferred to his native city, and gave it the name of *Eretrian*. Menedemus, though nobly descended, was obliged, through poverty, to submit to a mechanical employment, either as tent-maker or mason. He formed an early intimacy with Asclepiades, who was a fellow-labourer with him in his humble occupation. Having minds more adapted to study than manual labour, they resolved to devote themselves to the pursuit of philosophy. For this purpose, they left their native country, and went to Athens, where Plato presided in the academy. (See *ASCLEPIADES*.) In his own school at Eretria he neglected those forms which were commonly observed in places of this kind, and allowed his hearers and disciples to attend him in whatever posture they pleased, standing, walking, or sitting. At first Menedemus was received by the Eretrians with great contempt; and, on account of the vehemence with which he disputed, obtained the appellations of "Cur" and "Madman." But he afterwards rose into high esteem, and was entrusted with a public office, to which was annexed an annual stipend of 200 talents. He discharged the trust with fidelity and reputation, but accepted only of a fourth part of the salary attached to the appointment. He was sent upon several embassies to Ptolemy, Lyfander, and Demetrius, and rendered his countrymen essential services, by obtaining a diminution of their tribute, and rescuing them from other burdens. Antigonus entertained a personal respect for him, and professed himself one of his disciples. His intimacy with this prince created a suspicion among his countrymen, that he had a secret intention to betray their city into his hands. To save himself he fled to Antigonus, and soon after died, in the eighty-fourth year of his age. It is thought he precipitated his end by abstaining from food for several days, being oppressed with grief, as well on account of the ingratitude of his countrymen, as on his disappointment in not being able to prevail on Antigonus to restore the lost liberties of his country. Menedemus possessed great talents as a philosopher and disputant. He declared his opinions with freedom, inveighed with severity against the vices of others, and, by the purity of his own manners, commanded universal respect. He observed the strictest moderation in the manner of his living. His entertainments, which were frequented by many philosophers and men of distinction, were simple and frugal, consisting chiefly of vegetables. Enfield's Hist. vol. i.

MENEDEMUS, a Cynic philosopher, was a native of Lampascus, who lived during the reign of Antigonus, king of Macedon. At this period, the peculiarities of the Cynic sect had been carried to an absurd and ridiculous extreme. In Menedemus, the spirit of the sect was degenerated to downright madness: at first, its members being no more than severe public monitors, commanded attention and

respect, but their freedom in censuring had degenerated into scurrility, and the conduct of Menedemus surpassed, in folly and extravagance, every thing that had gone before him. He appeared in public dressed in a black cloak, with an Arcadian cap upon his head, on which were drawn the figures of the twelve signs of the zodiac, with tragic buskins on his legs, with a long beard, and with an ashen staff in his hand, exclaiming, that he was a spirit returned from the infernal regions to admonish and reform the world. Enfield's Hist. Phil.

MENEHOULD, *Str.*, in *Geography*, a town of France, and principal place of a district, in the department of the Marne. The place contains 3394, and the canton 12,820 inhabitants, on a territory of $437\frac{1}{2}$ kilometres, in 30 communes. The town is situated in a morass between two rocks, on the highest of which is a castle; 22 miles E.N.E. of Chalons. N. lat. $49^{\circ} 5'$. E. long. $4^{\circ} 55'$.

MENEJRE, a town of Arabia, in Yemen; 34 miles S.E. of Lobeia.

MENELAUS, in *Biography*, king of Sparta, famous in ancient history for the share which he took in the Trojan war, was son of Atreus, king of Argos, and brother of Agamemnon. He married Helen, the daughter of Tyn-darus, king of Sparta, and in her right succeeded to the crown of that country. According to the best account of the origin of the Trojan war, Paris, son of Priam, induced by the fame of Helen's beauty, paid a visit to the court of Menelaus, where he was most hospitably received. During his stay, Menelaus was obliged to take a voyage to Crete, and Paris made use of this opportunity to carry off Helen, together with all the treasure and rich moveables he could lay his hands upon. This injury was made a common cause by the petty kings of Greece, who, with a powerful army under the command of Agamemnon, laid siege to Troy. Menelaus was present as a leader of the confederates. In the tenth year of the Trojan war, Helen obtained the forgiveness and favour of Menelaus, by introducing him with Ulysses, the night that the city was reduced to ashes, into the chamber of Deiphobus, whom she had married after the death of Paris. This perfidious conduct totally reconciled her to her first husband, and she returned with him to Sparta, where Telemachus is represented in the *Odyssey* as finding them living in peace and prosperity. Menelaus is said to have been succeeded in this kingdom by two illegitimate sons, who were expelled by Orestes, son of Agamemnon. The palace which Menelaus once inhabited was entire in the days of Pausanias, as well as the temple which had been raised to his memory by the people of Sparta. Homer. Univer. Hist.

MENELAUS, a celebrated mathematician, who flourished under the reign of the emperor Trajan, was of Grecian extraction, but a native of Alexandria. He is called by Ptolemy a geometrician, as having made astronomical observations at Rome in the year 98 of the Christian era. He is supposed to have been the Menelaus referred to by Plutarch in his dialogue "De Facie quæ in orbe Lunæ apparet." He was author of three books "On Spherics," which have come down to the present times through the medium of the Arabic language. A Latin version of this work was published at Paris by father Merfenne, in 1664, with corrections, restorations, and additional illustrative propositions. Gen. Biog.

MENELAUS, called also *Menelaites*, in *Ancient Geography*, a town of Egypt, and capital of a nome called *Menelaites* by Pliny. According to Strabo, Menelaus is not far from the nome of Nitria.—Also, a town of Africa, in Marmarica,

rica, placed by Ptolemy in the interior of the country between Leuceæ and Gaphara

MENECLAUS, in *Geography*, a town of Africa, in Barca; 105 miles E.S.E. of Cureu. N. lat. 32° 10'. E. long. 23° 10'.

MENENIUS, in *Biography*. See *AGrippa*.

MENERANDRE, in *Geography*, a river on the S. coast of Madagascar, which runs into the sea, S. lat. 25° 5'. E. long. 42° 24'.

MENERBES, a town of France, in the department of the Mouths of the Rhone; 9 miles S.W. of Apt.

MENEROLA, a town of Genoa; 5 miles S.W. of Spezza.

MENES, in *Biography*, the founder of the Egyptian empire, was born at This, a town of Thebais, in Upper Egypt. He is supposed to have reigned 117 years after the birth of Phaleg, son of Heber, which was the year of the dispersion of the people throughout the earth. He built the town of Memphis, and in the prosecution of his work stopped the course of the Nile near it, by constructing a causeway several miles broad, and caused it to run through the mountains. By his ability and popularity he was deified after his death. He had three sons, who ruled after him, *viz.* Athotis, who ruled at This and Thebes; Curudes, who founded the kingdom of Heliopolis, afterwards the kingdom of Diospoli; and Necherophes, who reigned at Memphis.

MENESTREL, a musician, whose name and employment have been recorded by Pithon in his "History of the second Race of Kings of France," who tells us, that it was during the reign of Pepin that the chapel royal was established at Paris, under a music-master named Menestrel; which, perhaps, may have been the origin of the name of Menestrel, or Minstrel, being given, in after times, to musicians in general. Pepin died in 768.

MENESTRELS were the singers, and *Menestriers* the instrumental performers in France, who, in the time of king Robert, formed themselves into a society of musicians, in imitation of the ancient bards; they composed and executed the music to the poetry of the *trouvères, troubadours*, or *romancers*, who composed poems in rhyme. Others were called *jongleurs*, and *chantores* or *menestrels*.

In a tariff of St. Louis to regulate the toll at the entrance into Paris, it is said that the *jongleurs* should be excused paying the toll, upon condition that they sung a song, (hence, perhaps, the proverb of paying for any thing with a *song*), or made their monkeys dance, (whence, probably, the French have derived another proverb, "payer en monnoie de singe.")

MENESTRIER, JOHN BAPTIST LE, in *Biography*, an able antiquary, was born at Dijon in 1564. He obtained some considerable offices at court, but is particularly known by a work entitled "Medailles, Monnoies, et Monumens antiques d'Imperatrices Romaines." This was published in 1625; the author died in 1634, and in 1642 a posthumous work was given to the world by his friends, under the title of "Medailles illustres des anciens Empereurs et Imperatrices de Rome." Neither of these works is in much esteem by modern medallists.

Among the curious works of this ingenious Jesuit, his treatises on representations in music, and on ballets, or stage-dances, ancient and modern, should be consulted by those who read, as well as those who write histories of music and dancing: as the information they contain is original, and such as no other books can supply.

John Baptist le Menestrier, the learned antiquary of Dijon, who died in 1634, was an ancestor of the ecclesiastic,

and had the same singular passion for science and curious inquiries. He wrote on medals, coins, ancient monuments, on the Roman empresses, &c. Being buried in the church of St. Medard, in Dijon, the following extraordinary epitaph was formerly legible on his tomb-stone:

"Cy git Jean le Menestrier,
L'an de sa vie soixante-dix
Il mit le pied dans l'estrier,
Pour s'en aller en Paradis."

"Here John le Menestrier was put,
At threescore years and ten, precise;
Who then in stirrup placed his foot,
To go full speed to Paradise."

MENESTRIER, CLAUDE LE, also of Dijon, and a contemporary of the preceding, was likewise attached to the study of antiquity, and became keeper of the Barberini Museum. He is author of "Symbolica Dianæ Ephesiz Statua explicata," 4to. published in 1657. Moreri.

MENESTRIER, CLAUDE FRANCIS, a Jesuit known by his works on heraldry, &c. was born at Lyons in 1631. He entered, at an early age, into the society of the Jesuits, where he acquired a great knowledge of the ancient languages, and of literature in general. As he advanced in life, he devoted himself chiefly to the study of history, with all that relates to family distinctions, and the monuments of antiquity. He travelled into most of the countries of Europe, and by the knowledge which he acquired, he was enabled to make a figure in theological disputations, and in pulpit oratory. He was, however, particularly famous for his talents in planning and arranging all kinds of festive exhibitions, sacred and profane, from the entry of a prince to the canonisation of a saint. In his designs, devices, and inscriptions, his invention was inexhaustible. He had a great acuteness in decyphering old and mutilated inscriptions, blazoning coats-of-arms, explaining paintings and sculptures, and in all operations of antiquarian science. He died in 1705, at the age of seventy-four. The principal works of this author were, 1. "Histoire Civile ou Consulaire de la Ville de Lyon;" "Eloge Historique de la même Ville;" "L'Histoire du Regne de Louis le Grand par les Medailles, Emblemes, Devises, &c.;" "Methode du Blason;" "La Philosophie des Images;" besides these, however, he wrote a number of smaller pieces on similar topics. Moreri.

MENETOU-SALON, in *Geography*, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges; 9 miles N. of Bourges. The place contains 3277, and the canton 10,873 inhabitants, on a territory of 367½ kilometres, in 11 communes.

MENETOUS, a town of France, in the department of the Loir and Cher, and chief place of a canton, in the district of Romorantin; 8 miles S.E. of Romorantin. The place contains 824, and the canton 4794 inhabitants, on a territory of 240 kilometres, in 10 communes.

MENEZES, in *Biography*. This is the name of the Condes de la Ericeira, a noble house in Portugal, in which the love of literature, united with considerable talents, continued to be hereditary for many generations. In the General Biography, the most celebrated persons are mentioned, with their principal works, in one article. To this we shall be indebted for the following account. The first of the family distinguished for literary talents was Don Diego, who, in 1628, published "Vida de D. Henriquede Menezes Governador de la India," 4to. Madrid. The second distinguished person was Don Fernando, whose chief publications were,

were, 1. "Historiarum Lusitanarum libri decem ab anno 1640, usque ad annum 1656." 2. "Historia de Tangere," folio, Lisboa, 1732. 3. "Vida de el Rey D. Joam I." His brother, son-in-law, and heir, Don Luiz, published a still more valuable work than any of the foregoing, under the title of "Historia de Portugal Restaurado." The wife of Don Luiz kept up the credit and fame of the family as an author, and it has been said of her, that "she wrote not with the quill of an eagle, for of such there are many;—but with the quill of a Phoenix, of which there is but one." This lady, as we have hinted, belonged to the family by blood, as well as marriage, having married her father's brother. Don Francisco Xavier, the son of this marriage, left behind him forty-four works, of which the most known and celebrated is the "Henriqueida, Poema Heroico, em doze Cantos," 1741. The Conde, Don Henrique, founder of the royal house of Portugal, is the hero of the piece. It appears that the author of this work, at the age of eight, was member of one academy, which seems by its title to have been designed for extemporary speaking; and, when a little older, was admitted into another, of which, at twenty, he was president. This, says his biographer, was the age of academies in Portugal: he was secretary and protector of the Portuguese, and censor and director of the royal one; a member of the Arcadians of Rome, and of our own Royal Society. He had as correspondents the most learned men in the different nations of Europe. He says in his preface, that the knowledge which he has of Greek is not sufficient for him to understand Homer well, a proof how little that language was cultivated in his country, when the most learned man in it would make such a declaration: in other respects, this preface discovers a range of poetical reading which few have equalled, and none, perhaps, exceeded. The poem itself is not worse than its French name-fake, though its faults are of a different character. He was blind when he wrote it, and died before it was published. This truly estimable man was the munificent patron of letters. He increased the family library with 600 MSS., and 20,000 volumes.

"This vein was not yet exhausted; Don Luiz, the fifth Conde, wrote commentaries of his own administration in India, corrections, and a supplement to Bluteau's Portuguese dictionary, and also to Moreri. He completed the catalogue of the library which his predecessor had begun: it was one of the noblest which any private family ever collected together, but it has been dispersed, and I (Mr. Southey), who write, have purchased some volumes from its wreck at the stalls in London. Portuguese literature is deeply indebted to this noble house. Individuals have succeeded better, but no family has ever done so much." Gen. Biog.

MENF, in *Geography*. See MEMPHIS.

MENFRICI, a town of Sicily, in the valley of Mazara, containing about 2700 inhabitants; 9 miles N.W. of Sacca.

MENFUS KEDDUS, a town of Abyssinia; 60 miles S.S.E. of Siré.

MENGEN, a town of Wurtemberg, insulated in the county of Scheer; 33 miles S.W. of Ulm. N. lat. 48° 3'. E. long. 9° 23'.

MENGENGUT, a town of Prussia, in the province of Oberland; 12 miles E. of Osterrod.

MENGERINGHAUSEN, a town of Germany, in the county of Waldeck; 24 miles W.N.W. of Cassel.

MENGERSDORF, a town of Germany, in the principality of Culmbach; 13 miles S. of Culmbach.

MENGER-S-KIRCHEN, a town of Germany, in the county of Nassau-Dillenburg; 7 miles S.W. of Dillenburg.

MENGESTA SEMAIAT, a town of Abyssinia; 165 miles S. of Gondar.

MENGOLI, PETER, in *Biography*, was an able Italian mathematician in the 17th century, concerning the place and time of whose birth there is no trace. He studied mathematics under Cavalieri, to whom the Italians ascribe the invention of the first principles of the infinitesimal calculus. Mengoli was appointed professor of "Mechanics," in the college of nobles at Bologna, and acquired high reputation by the success with which he filled that post. His principal works are, "Geometriae Speciosae Elementa;" "Novae Quadraturae Arithmeticae, seu de additione Fractionum;" "Via regia ad Mathematicas ornata;" "Refrazione e paralasse Solare;" "Speculationi de Musica;" "Arithmeticae rationalis Elementa;" "Arithmetica realis." Moreri.

His "Speculationi di Musica," a desultory and fanciful work, was published at Bologna, 1670. An account of this treatise was given in the *Phil. Transf.* vol. viii. N° c. p. 6104. seemingly by Birchensha, who, at the close of the article, has not forgotten himself, or his own interest. The speculations contained in Mengoli's work are some of them specious and ingenious; but the philosophy of sound has been so much more scientifically and clearly treated since its publication, that the difficulty of finding the book is no great impediment to the advancement of music. He was still living in 1678.

MENGRAVILLA, in *Geography*, a town of Spain, in Old Castile, famous for its mines of salt: near Avila.

MENGS, ANTHONY RAPHAEL, in *Biography*, was born on the 12th of March, 1728, at Aulitz, in Bohemia. His father, whose name was Ismael, was a miniature and enamel painter, and dedicated his son to the art from his birth: hence he had him christened after the names of *Anthony Allegri da Correggio*, and *Raphael d'Urbino*. His first studies were of course under the eye of his father, who from his earliest childhood obliged him to labour with his pencil; and as soon as possible gave him information of geometry and chemistry, in which sciences he became the most intelligent artist in Europe. Seeing that his son pursued his studies with a reflective mind, Ismael justly concluded, that it would be right at once to introduce him to the fountain head of the art, and lay before him the purest models for his study; and, therefore, at the early age of 12, he took him to Rome, and there introduced him to the works of M. Angelo, Raphael, &c. &c. Young Mengs was so far advanced in the art as to be capable of relishing the superior productions now laid open before him; prints and drawings from which he had long been accustomed to copy: and was eagerly desirous of persevering in the laudable desire of imitating them. At first, his father confined him to drawing in crayons from the Laocoon, the Torso, and the works of M. Angelo; and afterwards from those of Raphael. This most excellent system of education he himself thwarted, by enacting too much and too minute an imitation, and too long confinement to that alone; at a time when, if the vivid fancy of youth had been permitted to indulge itself, Mengs might have imbibed the spirit which animates, which governs the compositions of those great labours which were before him, instead of dwelling on the surface, and forgetting the object of the whole; which is, or should always be, the prime end in view in all studies made upon the works of others. That he was capable of all this fully appears by what he did, particularly by his future reasonings (which are published) upon the works of the principal painters; and that he did not do it effectually, equally appears by his paintings; which possess more of the character of the lines and composition observable in the works of Raphael, who was his favourite, than his just perception

of point and interest in a story, and the true pathos with which he selected incidents, and gave expression and grace to his figures.

It was only for three years that his father, who was extremely tyrannical and arbitrary, allowed him to stay at Rome, at the end of which time, probably being anxious to turn his son's talents to account, he obliged him to return with him to Dresden, where all this excellent preparation was defaced, by our artist being employed to paint portraits in crayons; by which, however, he became known to, and employed by, the king of Poland, who made him his cabinet painter, gave him a house and a pension, without any other obligation, than to give him the preference of those works he might perform, and for which he would pay the full price.

With this good fortune he returned to Rome to prosecute his studies; at first copying, but at length beginning to compose his own pictures. About this time he married a young lady of a respectable family, Margarita Guazzi, and was in hopes of being permitted finally and fully to establish himself in Rome; but his father, at the end of four years, again, in 1749, forced him to return to Dresden, and in pursuance of his arbitrary feeling quarrelled with him, seized his whole property, and turned him out of doors.

His talents were now his only safeguard and support, and, to the honour of the king, proved truly so. His majesty patronized him, gave him a house and a carriage, appointed him his first painter, and doubled his pension, without any obligation, and permitted him again to visit Rome.

His first work there was a copy of the school of Athens by Raphael, for the earl of Northumberland, which is now at Northumberland House. The failure of affairs at the court of Saxony and Poland, which happened soon after, caused a stoppage of his pension, threw Mengs upon the world, and induced him to accept many commissions for pictures; the principal one of which, a fresco ceiling in the church of the Augustines, dedicated to St. Eusebius, acquired him great reputation, and some employment of the like nature in the villa Albani; where he painted in fresco Apollo, and the Muses on Parnassus.

Some pictures which Mengs had executed acquired him the favourable regard of the king of Naples, who, upon becoming king of Spain under the title of Charles III., sent for him to Madrid, offering him a ship of war to convey him, a salary of 2000 doubloons, a house, a carriage, and to defray all the expences attending his professional labours. This munificent offer was readily accepted, and Mengs arrived in Spain in October 1761. The king received him with great kindness, and continued the same attention to him all the while he remained in that country, which was several years. He executed a great number of pictures both in fresco and in oil, which were highly admired and applauded by the court, but were criticised by some, as being too cold and phlegmatic in their style and expression.

Excess of study, and disgust at the harsh conduct of some of his contemporaries, affected his health; and being deprived of the benefit of domestic enjoyment, having sent his family to Rome, he fell into dependancy, and a decline approaching, his life was despaired of, when he obtained permission to return to Rome, still enjoying his pension as first painter to the king.

His health and spirits were soon re-established in his favourite residence, and he was employed by Clement XIV. to paint in the Vatican; particularly in the cabinet where the ancient papirii were preserved. He prolonged his stay in Italy as long as he could, though advised

by his friend the chevalier d'Azara, the Spanish minister at Rome, that his return to Spain was looked for by the king, by whose command he was at last obliged to go there again. He took part of his family with him, and remained there two years and a little more, painting many things, and again becoming exhausted and ill, too ill to prosecute his labours, his majesty left him at full liberty to return, with his pension of 3000 scudi, and 1000 more to divide in dowry among his daughters.

He had not been long in Rome when he lost his wife, which severe affliction entirely changed his mind and manners, and rendered him morose and unhappy, a scourge to himself and those around him. His old disease returned upon him, and in a short time afterwards he paid the debt of nature, having only attained the age of 51.

If the name and qualifications of Mengs had not been so extravagantly exalted by his friend and commentator Azara, and by Winkelmann, it is most likely his memory would have been in more esteem with the world than it now is. But when they resorted, in speaking of his talents, to such a degree of absurdity, as to place him above all competitors, either ancient or modern; to speak of him as the man for whom it was reserved to unite all the excellencies of art, criticism is excited, and a more scrupulous and less prejudiced examination induced, which bellows upon our artist a far less exalted rank among those great men with whom he has been compared, and even to whom he has been preferred, than his partial and prejudiced friends allotted to him. He certainly was the most ingenious professor they were acquainted with. His long and laborious researches into the more obscure matters relating to art, and his careful and even enthusiastic examination of the works of the ancients, and consequent knowledge of them, rendered him in their eyes, who do not appear to have had so much taste as enthusiasm, a kind of demi-god. But it is not researches and knowledge of this nature which make the artist; they will indeed assist him with principles and materials, they will prevent compositions, and fill vacant spaces upon a canvas, or on a wall, with something agreeable to, or imposing upon, the eye; but if the soul be wanting, if the true perception of that which alone stimulates the feeling heart and understanding mind, impress not its energy upon the observer, the artist is but a mechanic, whose studies happen to have fallen into a more side-long track than those of the generality; or at most he may be saluted with the title of the man of science, never in comparison with the truly great artists will he merit their distinguishing appellation.

These remarks are justly applicable to Mengs, who, though a very ingenious and extraordinary man, is but a tame and rather uninteresting artist. Mr. Cumberland, in his memoirs of painters in Spain, has given a very excellent and just critique upon his merits, which we will here transcribe. He was excited to it by a remark of Mengs upon the discourses of sir J. Reynolds, in which that artist observes, that "those discourses would lead youth into error, because they abandon them to superficial principles, the only ones known to the author." After some little petulance exhibited in the former part of his answer to this remark, Mr. Cumberland says, "that Mengs was an artist that had seen much and invented little; that he dispenses neither life nor death to his figures, excites no terror, rouses no passions, and risks no slights; that, by studying to avoid particular defects, he incurs general ones, and paints with tameness and servility; that the contracted scale and idea of miniature painting to which he was brought up, is to be traced in all or most of his compositions, in which a finished delicacy of pencil ex-

hibits the hand of the artist, but gives no emanation of the soul of a master; if it is beauty, it does not warm; if it is sorrow, it excites no pity." The picture of our Saviour's appearing to Mary Magdalen in the garden, known by the name of *The Noli me tangere*, which is in the chapel of All Souls' college, Oxford, will enable our readers to judge how far these remarks are founded in truth.

As a critic, Mengs has a more fair claim to attention. He certainly entertained sublime ideas of the capabilities of art, and therefore inspires them in the minds of his readers. There is, however, too great a mixture of metaphysics and subtle disquisition in his writings, to be generally useful. His explanations of beauty and taste are extremely vague. The former is built entirely upon the Platonic system of the beauty of goodness. On this, however, he proposes material selection from various objects of the same kind, to produce the beautiful of each species, and this choice he completely confounds with taste. Notwithstanding these defects, his writings convey much useful matter, and present many important points, for the consideration of an artist; as they embrace all the essential principles of the art of painting. They were published after the death of Mengs, by his friend the chevalier d'Azara; who also mentions that all the technical parts of Winkelmann's history of the arts are written by Mengs.

MENHAIA, in *Geography*, a town of Fez, in the province of Chaus, inhabited by Arabs.

MENHUSS, a town of Africa, in the country of Barca; 160 miles S.W. of Tolomata.

MENIAL SERVANTS. See SERVANTS.

MENIAN COLUMN. See COLUMN.

MENIE', in *Geography*. See MINIET.

MENIF, or MENUF, a town of Egypt, and chief place of a district; 28 miles N. of Cairo.

MENIGOUTTE, a town of France, in the department of the Two Seves, and chief place of a canton, in the district of Parthenay; 11 miles S.S.E. of Parthenay. The place contains 880, and the canton 7101 inhabitants, on a territory of 240 kilometres, in 10 communes.

MENIL, a town of the Arabian Irak, on the Tigris; 110 miles S.E. of Bagdad.

MENILITE; *Menilit*, Wern.; *Leber-Opal*, Karst.; *Quarz-résinite menilite*, Häüy.

The colour of this fossil, on the planes of fracture, is between chestnut and liver-brown, passing into hair-brown, and into greyish-yellow; externally the brown variety possesses a blueish tarnish, owing to closely adhering particles of the matrix in which it is found.

It occurs in knob-shaped or tubercle imbedded masses, and in amorphous tuberculated pieces, with rough dull surface.

Internally it is glistening, passing into shining; lustre sometimes resinous.

Longitudinal fracture coarse splintery, passing into flat conchoidal; transversal fracture flat conchoidal, more or less in a parallel direction; fragments indeterminate angular and sharp-edged, translucent on the edges. It yields a greyish-white streak.

Not very hard; hardness that of the semiopal; brittle, easily frangible. Spec. grav. 2.185, Klapr.; 2.162, Jordan.

It is infusible before the blowpipe, but becomes of a lighter colour, opaque, and flawed. With borax it fuses slowly, and with some ebullition. According to Klapproth's

analysis of the menilite, a hundred parts are composed of

Silica	-	-	-	85.50
Argil	-	-	-	1.00
Lime	-	-	-	0.50
Oxyd of iron	-	-	-	0.50
Water and carbonaceous matter				11.00
				98.50

It is found near Paris, the darker variety at Menil-Montant, the lighter or greyish at Argenteuil; at both places under a thick bed of clay, in a particular kind of slate, called *Klebschiefer* by Werner, or *adhesive slate*. According to Häüy it also occurs on the banks of the Maas. A blackish-green fossil, agreeing in most of its characters with menilite, and likewise in being found imbedded in adhesive slate, is met with at Zamuto, in the district of Semplin, in Hungary.

This fossil was first referred by Werner to the semiopal; and Karsten still enumerates it as a particular subspecies of opal, under the name of liver-opal, derived from its colour.

MENIMAN, in *Geography*, a town of Asiatic Turkey, in Natolia, from which Smyrna draws its chief supply of fruits and provisions.

MENIN, a town of France, in the department of the Lys, and chief place of a canton, in the district of Courtray. This town consists of little more than one street, with one parish church, situated on the Lys; and yet it has been the subject of many contests and vicissitudes during various wars. The place contains 4911, and the canton 17,769 inhabitants, on a territory of 100 kilometres, in seven communes. N. lat. 50° 48'. E. long. 3° 5'.

MENING, in *Botany*, a name given by the people of Guinea to a plant of the *resinous* or *palma Christi* kind, which they use in medicine: they dry and powder the leaves, and then give them to be snuffed up the nostrils, to cure all sorts of stuffings or stoppages in the head. Its leaves resemble those of the finch and ivy, and are hairy; whence Petiver has named it *ricinus Guineensis hederæ quinquefolia Virginianæ facie foliis hirsutis*. It is not known to grow any where in America. Philof. Trans. N° 232.

MENINGE, in *Ancient Geography*, an island of Africa. Plutarch, in Mario, says that Marius landed on the island of Meninge, and that from thence he passed to Carthage. This island is called by Ptolemy Lothophagites, in which were two towns, viz. Gerrapolis and Meninge.

MENINGEA ARTERIA, in *Anatomy*, a branch of the internal maxillary artery distributed upon the dura mater. See ARTERY.

MENINGES, from *μνινξ*, a *membrane*; a term sometimes employed in speaking of the membranes of the brain.

MENINGOPHYLAX, from *μνινξ*, a *membrane*, and *φυλασσω*, to *guard*, an instrument in use amongst the ancient surgeons for protecting the dura mater and brain from injury, in their mode of trepanning. It was somewhat like the lenticular, only its blade was completely round, without any edge, and it ended, like this other instrument, in a lentiform cup.

MENINSKI, or MENIN, FRANCIS, in *Biography*, a considerable oriental scholar, was born at Lorraine in 1623. Of the early part of his life we have no account, but he studied at Rome, and being particularly attached to the acquisition of the Eastern languages, when about the age of thirty he accompanied the Polish ambassador to Constantinople, and there applied so assiduously to the study of the Turkish tongue, that in a very short time he was made first interpreter to the Polish embassy at the Porte; and afterwards

was raised to the office of ambassador plenipotentiary to that court. Hence he was naturalized in Poland, and added the termination *ski* to the family name of *Menius*. In 1661 he accepted the post of interpreter of the Oriental languages at the court of Vienna, and accompanied the imperial ambassador to the Porte. In 1669 he visited the holy Sepulchre at Jerusalem, and was created a knight of that order. His services were so much approved, that on his return to Vienna he was appointed one of the emperor's council of war, as well as first interpreter. He died in 1698. As an author, the great work of Meniuski was his "Thesaurus Linguarum Orientalium," published at Vienna in 1680, in four volumes folio. Of these the fourth was entirely destroyed by the falling of a bomb upon the author's house during the siege of Vienna by the Turks, which obliged him to recompose it. The other volumes were greatly injured at the same time, which rendered the work extremely scarce and dear. A new edition of it with improvements was begun at Vienna in the year 1780. The Turkish, Persian, and Arabian grammars contained in the "Thesaurus," were republished in two volumes quarto, 1756.

MENIPEAN, *Satira MENIPEA*, a kind of satire consisting of prose and verse intermixed.

It is thus called from Menippus, a Cynic philosopher, who delighted in composing satirical letters, &c. In imitation of him, Varro also wrote satires under the title of "Satira Menippæ;" whence this sort of composition is also denominated *Varronian satire*.

Among the moderns, there is a famous piece under this title, first published in 1594, against the chiefs of the league, called also the "Catholicon" of Spain. It is esteemed a master-piece for the time.

MENISCIUM, in *Botany*, so called by Schreber, the author of the genus, from *μηνίσκος*, a *crefcant*, in allusion to the shape of the fructification. Schreb. Gen. 757. Swartz. Syn. Fil. 19. Sprengel Crypt. 93. t. 3. f. 20. Cavan. Leccion. 548. Mart. Mill. Dict. v. 3. Lamarck Dict. v. 4. 93. Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*, Linn. Juss.

Gen. Ch. *Capsules* annulated, in small, single, curved lines, nearly parallel to each other, and situated transversely, in regular series, betwixt the veins of the frond. *Involucrum* none.

Eff. Ch. Fructification in a series of small, transverse, crescent-shaped lines, between the veins of the frond. *Involucrum* none.

1. *M. triphyllum*. Swartz. n. 1. Sprengel as above.—Frond three-leaved. Native of China and the East Indies. Sprengel represents the frond as about five inches long, smooth, consisting of one large, terminal, oblong, pointed, entire leaflet, and a pair of much smaller, opposite, sessile ones, a little below it. Each of the leaflets is furnished with a midrib, and numerous transverse, oblique, parallel veins, connected by fine, regular, decussating lines of fructification.

2. *M. reticulatum*. Sw. n. 2. (*Polypodium reticulatum*; Linn. Sp. Pl. 1549. *Aplenium forbifolium*; Jacq. Coll. v. 2. 106. t. 3. f. 2. *Filix latifolia non ramosa, nigris tuberculis pulverulenta*; Plum. Amer. 6. t. 9. *Lingua cervina, nigris tuberculis pulverulenta*; Plum. Fil. 92 t. 110.)—Frond pinnate; leaflets undivided.—Native of the West Indies. We have it from St. Kitt's. Plumier found it very abundantly in ascending the mountain called *de la Calabasse*, in Martinico. This is a very large and handsome fern, about four feet high; the stalks smooth and shining, dark brown, or black. *Leaflets* numerous, about a span long, and above

an inch wide, almost sessile, alternate, but all near the base, tapering to a sharp narrow point; the margin slightly crenate, or wavy. The whole under-side is covered with *fructification*, in curved lines, more answering to the form of a crescent than those of the former species. Sprengel compares Linnæus without reason for making this fern a *Polypodium*; for the latter, having never seen a specimen of fructification, necessarily trusted to Plumier, whose fronds, less faithful than usual, as well as his description, abundantly justify Lamarck.

3. *M. proliferum*. Sw. n. 3. (*Hemionitis prolifera*; Retz. Obs. falc. 6. 38.)—Frond pinnate; leaflets lanceolate, crenate, with axillary smaller leaflets. Sent by Koenig from the East Indies. It is described as a large decumbent fern, with alternate, sessile, lanceolate, crenate leaflets, about half a foot long, abrupt at their base. From these are produced, at their origin, other axillary fronds or branches, a foot and half long, often in pairs, whose leaflets are exactly like the former, but much smaller, and the stalk has a knot at the part whence they originate. Fructification in decussating irregular lines, so as sometimes to give the character of a *Polypodium*, sometimes of an *Aerostichum*.

4. *M. cristatum*. Lamarck Dict. v. 4. 94.—"Frond pinnate; leaflets nearly opposite, lanceolate, pointed; the lower ones pinnatifid, with obtuse finely toothed segments"—Native of Martinico. Fronds about a foot and a half high, or more, with numerous falcate leaflets, of a delicate texture, about four inches long, and near an inch broad. The margin is cut throughout into rounded lobes or segments, finely toothed at their edge. Fructification copious, in curved lines.

Swartz enumerates this among his doubtful species; we do not distinctly see for what reason.

5. *M. ferratum* Cavan. Leccion. 548.—"Frond pinnate; leaflets alternate, lanceolate, serrated."—Native of the Havannah. Fronds above two feet high, shining. Leaflets five inches long, the lower ones an inch broad; all sharp-pointed, finely toothed. Fructification in curved parallel lines.

This also is reckoned by Swartz among the species which merit further inquiry; as well as a *Meniscium* from Cayenne, of which nothing is given but the generic character by Richard in the *Actes de la Société d'Hist. Nat. de Paris*, v. 1. 114.

Although *Meniscium* is, as yet, known to consist of but few species, it has all the characters of a very natural genus, nearly resembling *Hemionitis* indeed in character, but dissimilar in habit.

MENISCUS, in *Optics*, a glass or lens, concave on one side, and convex on the other; sometimes also called *lunula*. See **LENS**, and **OPTIC GLASS**.

In a meniscus, if the diameter of the convexity be equal to that of the concavity, a ray, falling parallel to the axis, will continue parallel thereto after refraction.

Such a meniscus, therefore, will neither collect nor disperse the rays; and is therefore of no use in dioptries.

To find the focus of a meniscus, the rule is, as the difference of the semidiameters of the convexity and concavity is to the semidiameter of the convexity, so is the diameter of the concavity to the distance of the focus from the meniscus. Hence, if the semidiameter of the concavity be triple the semidiameter of the convexity, the distance of the focus from the meniscus will be equal to the semidiameter; and therefore the meniscus will be equivalent to a lens equally convex on either side.

Again, if the semidiameter of the concavity be double that of the convexity, the distance of the focus will be equal

to the diameter; and therefore the meniscus will be equivalent to a plano-convex lens.

If the semidiameter of the concavity be quintuple that of the convexity, the meniscus will be equivalent to a sphere. The semidiameter, therefore, of the convexity being given, that of the concavity required to remove the focus to any given distance from the meniscus, is easily found.

MENISPERMA, in *Botany*, the seventy-seventh natural order in Jussieu's system, the seventeenth of his thirteenth class, named from the principal genus belonging to it; see the next article. For the characters of the class, see **GERANIA**. The order is defined as follows:

Calyx of a definite number of leaves. *Petals* of a definite number, opposite to the calyx; with an equal number of scales, in some of the genera, at the inside of the petals and opposite to them. *Stamens* of a definite number, equal to that of the petals, and opposite to them. *Germens* several, with as many styles and stigmas. *Fruits* as many, either pulpy or capsular, kidney-shaped, each containing one seed, of their own shape; many of them however are frequently abortive, one only coming to perfection. *Embryo* flat, small, with thin lobes, situated at the top of the fleshy albumen, which is much more incurved than itself. *Stem* shrubby, mostly farmentose. *Leaves* alternate, simple, without stipulas. *Flowers* axillary or terminal, often in aggregate spikes or clusters, each collection attended by a single bractea; they often become dioecious by imperfection of the respective organs of impregnation.

The genera enumerated by Jussieu are *Cissampelos*; *Menispermum*; *Leaba* of Forskall, perhaps not different from it; *Epibaterium* of Forster; and *Abuta* of Aublet.

The opposite situation, with respect to each other, of the calyx, petals, and stamens, brings this order near that of the *Berberides*; but the germen of the latter is simple, with many seeds, their albumen straight, surrounding the whole embryo, which is longer than in the *Menisperma*, and their anthers are differently formed, being very peculiar, and opening by revolute valves, in the *Berberides*. Their habits moreover are very unlike.

MENISPERMUM received its name, composed of $\mu\eta\sigma\eta\sigma$, the *moon*, and $\sigma\pi\epsilon\rho\mu\alpha$, *seed*, from Tournefort, in the *Memoires de l'Acad. des Sciences* for 1705; in allusion to the crescent-like form of the seed. Linn. Gen. 530. Schreb. 700. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 411. Juss. 285. Michaux Boreal-Amer. v. 2. 241. Lamarck Dict. v. 4. 94. Illustr. t. 824. Gærtn. t. 46. and t. 70. Class and order, *Dioecia Dodecandria*. Nat. Ord. *Sarmentacea*, Linn. *Menisperma*, Juss.

Gen. Ch. Male, *Cal.* Perianth of two short linear leaves. *Cor.* Outer petals four, ovate, spreading, equal; inner eight, smaller, inversely heart-shaped, concave, four of them in an inner row and broader. *Stam.* Filaments 16, cylindrical, rather longer than the corolla; anthers terminal, very short, bluntly four-lobed.

Female, *Cal.* and *Cor.* as in the male. *Stam.* Filaments eight, like the male, but with pellucid abortive anthers. *Pist.* Germens two or three, superior, stalked, ovate, incurved, approaching each other; styles solitary, very short, recurved; stigmas eloven, obtuse. *Peric.* Berries two or three, roundish-kidney-shaped, of one cell. *Seeds* solitary, large, kidney-shaped.

Obs. By the accounts of authors, the number of the different parts of fructification either differs in different species, or varies in the same: The above characters are taken from *M. canadense*.

Ess. Ch. Male, Outer petals four, inner eight. Stamens sixteen.

Female, Petals as in the male. Eight imperfect stamens. Berries two or three, single-seeded.

A genus of twining, perennial, often shrubby, plants, altogether strangers to Europe, but found in North America, Arabia and Japan, as well as in the East and West Indies. The *roots* of some are large and solid, worthy of inquiry as to their medicinal powers. *Leaves* alternate, stalked, simple, generally undivided, entire, and more or less downy, of a heart-shaped or ovate figure, without stipulas. *Flowers* small, racemose, axillary, inconspicuous, of a green, whitish, yellowish, or lurid hue. *Berries* dark, the size of small peas, in some cases narcotic. The species are not very correctly understood, and it is probable many more exist than botanists have ascertained. The fourteenth edition of Syst. Veg. enumerates eleven. The volume of Willdenow which comprehends this genus is not yet come to our hands. We shall therefore only mention some of the most remarkable species.

M. canadense. Canadian Moon-feed. Linn. Sp. Pl. 1468. Mill. Illustr. t. 93. (*Hedera monophylla, convolvuli foliis, virginiana*; Pluk. Phyt. t. 36. f. 2)—Leaves peltate, heart-shaped, rounded and angular. Clusters compound, drooping.—Native of North America—"from Canada to Carolina." Michaux. *Stem* somewhat shrubby, twining contrary to the sun's course, (*Miller*,) round, smooth, leafy, slightly branched. *Leaves* on long stalks, generally broader than long, peltate a little way from the base, either simply cordate and undivided, or more or less deeply lobed, the lobes either rounded or angular; the upper side dark green, nearly smooth; under glaucous, a little hairy at the ribs and numerous veins. *Panicles* in pairs, shorter than the leaves, drooping. *Flowers* greenish-white. *Berries*, according to Clayton, black.—This plant is preserved in some botanic gardens, but has little beauty to recommend it to general favour.

M. virginicum. Virginian Moon-feed. Linn. Sp. Pl. 1468. (*M. folio hederaceo*; Dill. Elth. v. 2. 223. t. 178. f. 219.) Upper leaves ovate, undivided; lower three-lobed and wavy. Clusters simple, solitary, erect.—Native of Virginia. Linnaeus appears not to have known this species. The specimen in his herbarium, from whence the specific character was taken, is only the foregoing. Dillenius has well figured and described the real *virginicum*, as having *leaves* much resembling ivy, the upper ones being ovate and undivided; the lower lobed and angular. The latter especially are somewhat downy. None of them are peltate. The *flowers* are whitish, in upright, simple, much smaller clusters. *Berries* black. Michaux does not mention this in his *Flora*. It is said to be cultivated in the Cambridge garden, flowering in July.

M. carolinum. Carolina Moon-feed. Linn. Sp. Pl. 1468. Michaux Boreal-Amer. v. 2. 242.—Leaves heart-shaped, downy beneath. Clusters cymose.—Native of Carolina, Linn. also of Georgia and Florida. Michaux. This has the *leaves* heart-shaped, undivided, roughish above, soft and downy beneath. *Clusters* nearly as long as the leaves, cymose, hairy, of numerous small *flowers*. Michaux says the *berries* are red; otherwise we should have a suspicion that his plant was the *virginicum*.

M. Cocculus. Indian-berry Moon-feed. Linn. Sp. Pl. 1468. (*Cocculæ officinarum*; Bauh. Pin. 511. Cocci; Ger. em. 1548. Tubabaccifera; Rumph. Amb. v. 5. 35. t. 22.)—Leaves heart-shaped, pointed, somewhat downy beneath. Clusters compound, from the naked woody stem. *Berries* nearly globular. Native of Ceylon and Malabar. This has a very woody, branched and twisted *stem*, from whence the *flowers* proceed, in compound clusters. The branches

branches are leafy. *Leaves* large, a span long, heart-shaped, pointed; dark green above; downy beneath; on long twisted *footstalks*. *Berries* purplish-black, as big as a black currant; but they come to us dried, and of a much smaller size. They are used in India for catching fish, which they intoxicate if thrown into the water. Their use for this purpose is, we believe, prohibited in England; nor is it easy to account for the copious importation of these berries as an article of trade, unless they serve to adulterate fermented liquors, as is often reported! (See *Cocculus* and *Cissampelos*.) We apprehend that Poiret, quoted in the last article, has confounded two very distinct plants. We have from the East Indies, by the name of *Menispermum orbiculatum*, as well as from the Mauritius, specimens which answer exactly to his description of the female *Cissampelos Cocculus*; but their axillary simple *clusters*, and large heart-shaped *bracteas*, to say nothing of their rounder *leaves*, mark them as sufficiently distinct from the above shrub of Rumphius. Perhaps the berries of several Indian plants, of this family, may have the same intoxicating quality, and be used indiscriminately.

MENISPERMUM, in *Gardening*, contains plants of the hardy climbing kind, of which the species cultivated are, the Canadian moon-feed (*M. canadense*); the Virginian moon-feed (*M. virginicum*); and the Carolina moon-feed (*M. carolinum*.)

Method of Culture.—The two first sorts are easily propagated by laying down the branches in the autumn season, and when the layers have made good roots, in the following autumn they may be separated and planted out where they are to remain. As their branches are weak and slender, they require support; and when planted near trees thrive better than in an open situation.

And the third sort may be increased by parting the roots, and planting them out in the spring, a little before the plants begin to shoot, in warm situations where the soil is light, as in strong retentive land the roots are apt to rot. When planted close to a wall exposed to the south or west, their stalks may be fastened against the wall to prevent their trailing upon the ground; in which situations the plants frequently flower. They should have a little shelter in severe frost, in order to preserve their stalks.

All these plants affords ornament and variety in the shrubberies and other parts of pleasure grounds.

MENITZ, in *Geography*, a town of Moravia, in the circle of Brunn; nine miles S.S.E. of Brunn.

MENKIN, a town of Asiatic Turkey, in Natolia; 36 miles N.E. of Boli.

MENMEN, a town of Asiatic Turkey, in Natolia; 18 miles N.W. of Smyrna.

MENNO, in *Biography*. See the following article.

MENNONITES, in *Ecclesiastical History*, a sect in the United Provinces, in most respects the same with those in other places called Anabaptists.

They had their rise in 1536, when Menno Simon, a native of Friesland, who had been a Romish priest, and a notorious profligate, resigned his rank and office in the Romish church, and publicly embraced the communion of the Anabaptists.

Menno was born at Witmarsum, a village in the neighbourhood of Boifwert, in Friesland, in the year 1505, and died in 1561, in the duchy of Holstein, at the country seat of a certain nobleman, not far from the city of Oldesloe, who, moved with compassion by a view of the perils to which Menno was exposed, and the snares that were daily laid for his ruin, took him, with certain of his associates, into his protection, and gave him an asylum. The

writings of Menno, which are almost all composed in the Dutch language, were published in folio, at Amsterdam, in the year 1651. About the year 1537, Menno was earnestly solicited by many of the sect with which he connected himself, to assume, among them, the rank and functions of a public teacher; and as he looked upon the persons who made this proposal, to be exempt from the fanatical phrenzy of their brethren at Munster (though, according to other accounts, they were originally of the same stamp, only rendered somewhat wiser by their sufferings), he yielded to their intreaties. From this period to the end of his life he travelled from one country to another, with his wife and children, exercising his ministry, under pressures and calamities of various kinds, that succeeded each other without interruption, and constantly exposed to the danger of falling a victim to the severity of the laws. East and West Friesland, together with the province of Groningen, were first visited by this zealous apostle of the Anabaptists; from thence he directed his course into Holland, Guelderland, Brabant, and Westphalia, continued it through the German provinces that lie on the coasts of the Baltic sea, and penetrated so far as Livonia. In all these places his ministerial labours were attended with remarkable success, and added to his sect a prodigious number of followers. Hence he is deservedly considered as the common chief of almost all the Anabaptists, and the parent of the sect that still subsists under that denomination. Menno was a man of genius, and directed by a very sound judgment; he possessed a natural and persuasive eloquence, and such a degree of learning as made him pass for an oracle in the estimation of the multitude. He appears, moreover, to have been a man of probity, of a meek and tractable spirit, gentle in his manners, pliable and obsequious in his commerce with persons of all ranks and characters, and extremely zealous in promoting practical religion and virtue, which he recommended by his example, as well as by his precepts. The plan of doctrine and discipline drawn up by Menno was of a much more mild and moderate nature than that of the furious and fanatical Anabaptists, whose tumultuous proceedings have been recited under that article, but somewhat more severe, though more clear and consistent than the doctrine of the wiser branches of that sect, who aimed at nothing more than the restoration of the Christian church to its primitive purity. Accordingly, he condemned the plan of ecclesiastical discipline, that was founded on the prospect of a new kingdom, to be miraculously established by Jesus Christ on the ruins of civil government and the destruction of human rulers, and which had been the fatal and pestilential source of such dreadful commotions, such execrable rebellions, and such enormous crimes. He declared, publicly, his dislike of that doctrine which pointed out the approach of a marvellous reformation in the church by the means of a new and extraordinary effusion of the Holy Spirit. He expressed his abhorrence of the licentious tenets which several of the Anabaptists had maintained, with respect to the lawfulness of polygamy and divorce, and, finally, considered as unworthy of toleration, those fanatics who were of opinion that the Holy Ghost continued to descend into the minds of many chosen believers, in as extraordinary a manner as he did at the first establishment of the Christian church, and that he testified this peculiar presence to several of the faithful, by miracles, predictions, dreams, and visions of various kinds. He retained, indeed, the doctrines commonly received among the Anabaptists, in relation to the baptism of infants, the millennium, or thousand years reign of Christ upon earth, the exclusion of magistrates from the Christian church, the abolition of war, and the prohibition of oaths enjoined by our

Saviour, and the vanity as well as the pernicious effects of human science. But while Menno retained these doctrines in a general sense, he explained and modified them in such a manner, as made them resemble the religious tenets that were universally received in the Protestant churches; and this rendered them agreeable to many, and made them appear inoffensive even to numbers who had no inclination to embrace them. It however so happened, that the nature of the doctrines considered in themselves, the eloquence of Menno, which set them off to such advantage, and the circumstances of the times, gave a high degree of credit to the religious system of this famous teacher among the Anabaptists, so that it made a rapid progress in that sect. And thus it was in consequence of the ministry of Menno, that the different sorts of Anabaptists agreed together in excluding from their communion the fanatics that dishonoured it, and in renouncing all tenets that were detrimental to the authority of civil government; and, by an unexpected coalition, formed themselves into one community.

Though the Mennonites usually pass for a sect of Anabaptists, yet M. Herman Schyu, a Mennonite minister, who has published their history and apology, maintains, that they are not Anabaptists, either in principle or by origin. However, nothing can be more certain than this fact, viz. that the first Mennonite congregations were composed of the different sorts of Anabaptists, of those who had been always inoffensive and upright, and of those who, before their conversion by the ministry of Menno, had been seditious fanatics; besides, it is alleged that the Mennonites do actually retain, at this day, some of those opinions and doctrines, which led the seditious and turbulent Anabaptists of old to the commission of so many and such enormous crimes: such particularly is the doctrine concerning the nature of Christ's kingdom, or of the church of the New Testament, though modified in such a manner as to have lost its noxious qualities, and to be no longer pernicious in its influence.

The Mennonites are subdivided into several sects; whereof the two principal are the Flandrians, or Flemingians, and the Waterlandians. The opinions, says Mosheim, that are held in common by the Mennonites, seem to be all derived from this fundamental principle, that the kingdom which Christ established upon earth is a visible church or community, into which the holy and just alone are to be admitted, and which is consequently exempt from all those institutions and rules of discipline, that have been invented by human wisdom, for the correction and reformation of the wicked. This principle, indeed, was avowed by the ancient Mennonites, but it is now almost wholly renounced; nevertheless, from this ancient doctrine, many of the religious opinions, that distinguish the Mennonites from all other Christian communities, seem to be derived: in consequence of this doctrine, they admit none to the sacrament of baptism, but persons that are come to the full use of their reason; they neither admit civil rulers into their communion, nor allow any other members to perform the functions of magistracy; they deny the lawfulness of repelling force by force, and consider war, in all its shapes, as unchristian and unjust; they entertain the utmost aversion to the execution of justice, and more especially to capital punishments; and they also refuse to confirm their testimony by an oath. The particular sentiments that divided the more considerable societies of the Mennonites are the following; the rigid Mennonites, called the Flemingians, maintain with various degrees of rigour, the opinions of their founder Menno, as to the human nature of Christ, alleging that it was produced in the womb of the Virgin, by the creating power of the Holy Ghost; the obligation that binds us to wash the feet

of strangers, in consequence of our Saviour's command; the necessity of excommunicating and avoiding, as one would do the plague, not only avowed sinners, but also all those who depart, even in some light instances pertaining to dress, &c. from the simplicity of their ancestors; the contempt due to human learning, and other matters of less moment. However, this austere system declines, and the rigid Mennonites are gradually approaching towards the opinions and discipline of the more moderate Waterlandians.

The first settlement of the Mennonites, in the United Provinces, was granted them by William, prince of Orange, towards the close of the sixteenth century; but it was not before the following century, that their liberty and tranquillity were fixed upon solid foundations, when, by a confession of faith, published in the year 1626, they cleared themselves from the imputation of those pernicious and detestable errors that had been laid to their charge. In order to appease their intestine discords, a considerable part of the Anabaptists of Flanders, Germany, and Friesland, concluded their debates in a conference held at Amsterdam, in the year 1630, and entered into the bonds of fraternal communion, each reserving to themselves a liberty of retaining certain opinions. This association was renewed and confirmed by new resolutions, in the year 1649; in consequence of which the rigorous laws of Menno and his successors were, in various respects, mitigated and corrected. Mosheim's Eccl. Hist.

MENOCHIO, JACOPO, in *Biography*, a learned Italian jurist, was born at Pavia, where he was probably educated, and was elected, in 1555, to the professorship of civil law in its university. Five years afterwards he accepted an invitation from Emanuel Philibert, duke of Savoy, to the newly erected university of Mondovi. In 1566, he removed to Padua, and became professor there, first of common law, and afterwards of civil law. In 1589, he was recalled by the senate of Milan to Pavia, and was, at length, elected a senator of Milan, and president of the extraordinary magistracy. He died in the city in 1607. He was a voluminous writer on subjects connected with his profession, some of which are still referred to by lawyers, particularly his treatises "De conjecturis ultimum Voluntatum," and "De tacitis et ambiguis conventionibus." These are held in high estimation, and their author was unquestionably reckoned the first doctor in civil and canon law of the age in which he lived.

MENOCHIO, JOHN STEPHEN, a learned Jesuit, who flourished in the former part of the seventeenth century, son of the preceding, was born at Pavia in 1576. At the age of seventeen he entered the society of Jesus, where he distinguished himself by his industry and talents, and was, at the close of his academical course, selected to fill the chair of professor: he was afterwards raised to the most honourable posts belonging to the society, in the colleges and provinces of Italy. He died at Rome in 1656. His principal works are, 1. "Hieropoliticon, seu Institutiones Politicæ à Sacris Scripturis depromptæ;" 2. "De Republica Hebræorum;" 3. "Institutiones Economicæ ex Sacris Literis depromptæ;" 4. "Brevis Explicatio sensus Literalis totius Scripturæ." The best edition of the last mentioned work was edited by father Tournemine in 1719, in 2 vols. folio: it was accompanied with a number of valuable treatises and dissertations on biblical subjects. This father wrote "A History of Christ," and six volumes of "Dissertations," chiefly intended to elucidate the holy scriptures. Moreri.

MENOLOGY, MENOLOGIUM, from *μην*, month, and *λογος*, discourse, in the Greek church, is much the same with *martyrology*, or *calendar*, in the Latin.

The Greek menologium is divided into the several months in the year; and contains an abridgment of the lives of the saints, with a bare commemoration of the names of such whose lives were never written. The Greeks have various menologies; and the Romans tax them with inserting divers heretics, in their menologies, as saints. Baillet treats of them at large.

MENORRHAGIA, in *Medicine*, an excessive discharge of the menses in women.

The flow of the menses is considered as excessive, when it recurs more frequently, when it continues longer, or when, during the ordinary continuance, it is more abundant, than is usual with the same person at other times, and more especially when it gives rise to a train of symptoms, indicative of a general diminution of the constitutional strength. But as most women are liable to some inequality with respect to the period, the duration, and the quantity of the catamenia; so it is only when these deviations are excessive, or permanent, so as to induce a manifest deterioration of the health, that they are to be deemed morbid. The affections of the other functions of the body, therefore, are considered by Dr. Cullen as the chief test of the excessive discharge in individuals respectively. When a larger flow than usual, he says, of the menses has been preceded by headache, giddiness, or dyspœa, and has been ushered in by a cold stage, and is attended with much pain of the back and loins, with a frequent pulse, heat and thirl, it may then be considered as preternaturally large. (Cullen, First Lines, par. 971.) The symptoms which inordinate menstruation leaves behind, however, are the most decided proofs of its morbid influence. For after a repetition of the copious discharges, the patient exhibits many symptoms of debility: the face becomes pale, and, if the loss of blood have been profuse, of a remarkably fallow or yellowish-white complexion, which has been aptly termed exsanguine, or bloodless; the pulse is weak and small, and rather more frequent than natural; an unusual lassitude is felt, and great debility on attempting to use exercise; the breathing is hurried by slight exertions; and the back becomes painful from continuance in an erect posture, in consequence of the feebleness of the muscles which support it: towards evening, likewise, the feet are somewhat enlarged by œdematous swelling. Other marks of debility, too, often appear; especially loss of appetite, with pain of the stomach, flatulence, and other symptoms of indigestion; frequent tendency to syncope or fainting; palpitation of the heart; and a weakness of mind, which becomes liable to strong emotions from slight causes, particularly when suddenly applied. From the local debility, produced in the parts from which the excessive discharge proceeds, there is also frequently a mucous discharge, or leucorrhœa, succeeding the menorrhagia; and, in many cases, when the debility has been much augmented by a recurrence of the disorder, there is a regular alternation of the one and the other; the leucorrhœa always appearing on the cessation of the menorrhagia, and continuing until the latter again returns; or, in a word, becoming habitual. See **LEUCORRHŒA**.

We shall not here enter into any theoretical discussion of the nature of the menstrual hæmorrhagy. It will be sufficient to state, that it is generally of what is called the active kind, and that it is accompanied by some degree of febrile *nifus* throughout the circulating system. The menorrhagia has hence been considered as depending, either upon the preternatural increase of the hæmorrhagic effort of the vessels of the uterus, or upon a preternatural laxity of the extremities of the uterine arteries, the hæmorrhagic effort remaining as in the natural state. Cullen, loc. cit.

The *existing causes* of menorrhagia may, therefore, be included under the following heads: 1st Those which increase the plethoric state of the uterine vessels; such as a full nutritious diet, much strong liquor, and especially when taken to the length of frequent intoxication, or combined with a sedentary life. There is much less of menorrhagia among the females of the lower class, in the country, who use a moderate diet, and take regular exercise, than among the ladies of the higher class, who live high, and use little active exercise, and particularly among those who take wine freely, though not to excess. And when young women have been weakened by this hæmorrhage, their matron-friends have too often recourse to more wine, and fuller diet, to restore the strength. This is even done in the pregnant state, to prevent abortions, when the opposite system should be adopted, with a view of diminishing both local and general plethora. 2^{dly}. All causes which determine the blood more copiously and forcibly into the uterine vessels, tend of course to bring on menorrhagia. Such are violent strainings of the whole body, from particular exertions of the muscular strength; violent shocks from falls; severe blows or contusions on the lower belly; violent passions of the mind; and violent exercise, especially in dancing. For in the last mentioned instance, the combination of the muscular exertion with the erect posture tends materially to direct the current of blood to the uterus: and hence the exercise of dancing has sometimes been found an effectual remedy for obstructed menstruation. 3^{dly}. Whatever irritates particularly the vessels of the uterus, may induce menorrhagia; as excess in venery, or the exercise of it during the time of menstruation; a coëive habit of body, giving occasion to violent straining at stool; cold applied to the feet. 4^{thly}. Whatever may have forcibly overstrained the extremities of the uterine vessels, and left them consequently in a weakened and relaxed state: such as frequent abortions, and tedious difficult labours, which give rise to excessive discharge; likewise frequent pregnancy, without nursing, which often not only deranges the general health, but occasions such a derangement of the uterine system, as leads to the production of frequent abortion, terminating in the constant occurrence of menorrhagia and leucorrhœa in alternate succession. And, lastly, all causes inducing a general laxity of the habit, such as living much in hot chambers, drinking much of warm relaxing liquors, as tea and coffee; or, on the other hand, the inability of procuring more substantial diet, combined with watching, fatigue, anxiety of mind, and other causes of constitutional debility, which often give rise to the constant alternations of menorrhagia and leucorrhœa in women of the lower classes.

The *treatment* of menorrhagia must necessarily differ according to the different causes of the disease, and the different states of constitution under which it occurs. In all instances, however, it is of the first importance to avoid the immediate causes of the malady, where these are obvious, and can be shunned; for in this way the returns of the disease may be often entirely warded off, and the health be fully restored, without recourse to medicine.

When this has not been done, and a copious menstrual discharge has come on, it will require the same kind of treatment as other active hæmorrhagies; especially if the patient be of a moderately strong habit; namely, such means as tend to allay inordinate action of the blood-vessels. One of the most important of these means is the application of *cold*, or, more correctly speaking, the abstraction of the stimulus of heat. With this view the apartment should be kept cool, the bed clothes should be light, and the beds not too soft; cold drink should be taken, as freely as the former

former habits of the patient will allow; and even cold applications should be made, as near to the bleeding vessels as may be, by applying wet cloths to the pudendum and round the loins. At the same time it is extremely important for the patient to remain entirely at rest, and that in the horizontal posture; to avoid the quickened circulation, which exertion produces, and the influence of gravitation upon the unsupported vessels in the erect position. The diet should likewise be light and cooling, all stimulants being discarded; and the bowels should be kept open by gentle laxatives, that occasion little stimulus; such as the neutral salts, castor oil, manna, sulphur, &c. Or the lower bowels may be emptied by clysters, which, if used cold, will have the double effect of removing the irritation of feces, and also of refrigerating the uterus, by the contiguity of these parts.

It now and then happens that menorrhagia occurs in robust women, and is accompanied with quickness and some hardness of the pulse, with severe pains in the back resembling those of parturition, and other febrile symptoms. In these cases it is sometimes advisable to diminish the general action of the vascular system by bleeding from the arm, such a practice, however, is not often necessary; for there are few cases, in which the refrigerating plan above mentioned, if pursued with attention and diligence, will not tend to moderate the discharge.

On the other hand, when the menorrhagia arises from an apparent relaxation of the vessels of the uterus, although the practice of depletion must not be adopted, yet all the sources of irritation must be shunned with equal care: for, under such circumstances, the general irritability, or susceptibility of excitement, is usually much increased, and less active stimuli produce a greater effect. The menorrhagia may be presumed to arise from such a relaxed state of the uterine vessels, from the general debility and laxity of the patient's habit, indicated by paleness of complexion, thin and flabby state of the muscular flesh, languor, and incapability of exertion; as well as from a knowledge of her previous state of indisposition, of her mode of life, and of the immediate exciting causes; and particularly from the circumstance, that, in the intervals of menstruation, she is subject to leucorrhœa. Quietness and the horizontal posture are still more requisite in this than in the former case. And as there is often much general irritation combined with this condition of the habit, small doses of an opiate may be employed, with considerable benefit, in moderating the discharge. In the case of a plethoric habit, however, opiates would tend to produce an aggravation of the complaint by their stimulus, and therefore must be employed with caution. Astringent medicines must be resorted to, in the case of menorrhagia from relaxation, such as alum, the sulphuric acid, and some of the preparations of iron. The astringent operation of these, however, when given internally, is not always very active: the chalybeates, especially the muriated tincture of iron, are, on the whole, the most efficacious. The astringents may be employed externally, that is, may be applied locally, as washes, with advantage. These astringent and tonic medicines, however, are administered perhaps with more decided benefit, in the intervals of menstruation, when they act rather as preventives, than as directly curative, by strengthening the whole system; and tend also to remove the leucorrhœa, which so often exists at those times. Cold bathing, chalybeate medicines, the metallic salts, cinchona and other bitters, together with exercise, especially in a carriage, are all serviceable in this view, during the intervals: and all the remedies recommended in the case of *Leucorrhœa*, (see that article,) al-

though some of them are too stimulant to be exhibited during the occurrence of menorrhagia from debility, may be resorted to with benefit in the intervals. The patients should also use a good nutritious diet at the same time. And it may be added, that these remedies should be employed in menorrhagia, from whatever causes it may have been originally produced, if the disease have already induced a considerable degree of debility in the body. See Cullen, First Lines, par. 966—974. Hamilton on Female Complaints.

MENOSTEY, in *Geography*, a town of France, in the department of the Jura; four miles E.S.E. of Auxerre.

MENOTTE, a river of Cambodia, which runs into the gulf of Siam, N. lat. $11^{\circ} 32'$. E. long. $101^{\circ} 30'$.

MENOUGAT, a town of Asiatic Turkey, in Caramania; 20 miles N. of Alanieli.

MENOUX, ST., a town of France, in the department of the Allier; seven miles W. of Moulins.

MENS, a town of France, in the department of the Isère, and chief place of a canton, in the district of Grenoble; 22 miles S. of Grenoble. The place contains 1883, and the canton 6516 inhabitants, on a territory of 242½ kilio metres, in ten communes.

MENSA *et Thoro*, *Divorce à*. See *DIVORCE*.

MENSÆ DOMESTICUS. See *DOMESTICUS*.

MENSALIA, MENSALS, such parsonages or livings as were formerly united to the tables of religious houses; and therefore by canonists called *mensal* benefices. See *PARSONAGE* and *BENEFICE*.

MENSARII, among the Romans, officers appointed to manage the public treasury, being sometimes three, and sometimes five in number.

MENSES, in *Physiology*, the monthly discharge from the uterus of the female subject. See *GENERATION*, under the head of *Physiology of the Female Organs*.

MENSES, *Suppression of*, in *Medicine*, or *Amenorrhœa* in the language of the nosologists, an interruption to the monthly discharge of women.

The interruption of the menstrual flux has been considered by physicians of two kinds; namely, the one, when the menses do not begin to flow at that period of life at which they usually appear, which has been called the *retention* (or *emanatio mensium*); and the other, when, at a subsequent age, and after they have repeatedly taken place, they cease to return (independently of pregnancy) at their usual periods, which has been called the *suppression* of the menses (*suppressio mensium*.) See Cullen, *Nosol. Method. Gen.* cxxvi.

The first of these species of amenorrhœa, the *retention* of the menses, occurs of course in girls about the age of puberty, and is accompanied by a number of symptoms, indicative of great general languor of the whole habit; but it is most commonly marked especially by an extraordinary paleness of the complexion, often with some degree of yellow, or even of a greenish hue, from which the appellation of *green-sickness*, or technically *chlorosis*, has been given to the disease. It is true, indeed, that this appearance of the complexion is not always present, where there is a *retention* of the catamenia; but the general train of symptoms varies little, and the same plan of treatment is requisite under most of the varieties of the complaint; we shall, therefore, not repeat here the detail of the symptoms, or of the methods of cure, which we have described at great length under the article *CHLOROSIS*; which see.

The *suppression* of the menstrual flux, then, after it has been for some time established in its regular course, will be the subject of the few following observations. Every interruption

interruption of the discharge, after it has once taken place, is not to be considered as a case of suppression; for, at its first appearance, it is not always immediately established with perfect regularity; and, therefore, an early interruption, especially when accompanied with the chlorotic symptoms, may be deemed a case of *retention*. On the other hand, the discharge may, at any period of life, be suppressed, when great general debility is induced by any cause; and it commonly is thus interrupted, when any great chronic affection occurs, to enfeeble the powers of life. In such cases, the suppression is merely symptomatic of those other affections, and does not itself become an object of medical treatment.

Most of the instances of idiopathic suppression of the catamenia, in this country, are occasioned by, or at least are ascribed to, the action of *cold*, which is believed to produce a constriction of the extreme vessels of the uterus, and thus to occasion a resistance to the flow of blood through them. The influence of fear, and other depressing passions, is supposed to produce a similar effect. The suppression seldom continues long, before it is accompanied by various symptoms or disorders in different parts of the body; partly, perhaps, originating from an irregular determination of blood into other organs, in consequence of the phlogistic condition occasioned by the suppression of the customary discharge; and partly from the great general sympathy of the whole nervous system, and of several organs in particular, with the condition of the uterus. From the first of these causes arise hæmorrhages from various parts; as from the nose, lungs, stomach, &c. when the menses are suppressed; as well as violent head-ache, acute pains in the chest, &c.; and, at the same time, from the nervous sympathy, various hysterical and other nervous affections occur, often to a formidable extent. The convulsions of hysteria, thus produced, are sometimes indeed more violent even than those of epilepsy; the colic pains, with costiveness, the *globus* in the throat, the violent flatulence, and other symptoms of dyspepsia, become often exceedingly tormenting.

Where the suppression of the catamenia is obviously idiopathic, and productive of these symptoms secondarily, the principal indication of cure appears to be to remove the obstructed state of the circulation in the vessels of the uterus. In very strong and robust habits, where, together with acute local pains, there is a great tendency to hæmorrhage, and a febrile or inflammatory disposition also manifests itself, even blood-letting may be resorted to with benefit in the commencement, to lessen the constrictive action of the blood-vessels in general; and in such cases, free purgation, together with the antiphlogistic regimen, will likewise be requisite. In the great majority of instances, however, the detraction of blood is unnecessary. A beneficial change is often produced upon the action of the uterine vessels, by local remedies; such especially as warm bathing, directed to the region of the uterus, by means of the semicupium, or of fomentation; the pedilavium; or emollient glysters, which, from the contiguity of the large intestine to the uterus, operate as an internal fomentation. In cases where the suppression is accompanied with great pain about the uterine region, but without fever, an anodyne glyster, combining the effects of fomentation with those of an opiate, is sometimes extremely beneficial. Dr. Gregory used to mention, in his lectures at Edinburgh, that an anodyne enema, administered at night, had sometimes brought back the catamenia before morning. Such applications, indeed, appear to be particularly efficacious, when there is an obvious attempt, as it were, in the constitution to effect the discharge. For, as Dr. Cullen has remarked, it commonly

happens, in the cases of suppressed catamenia, that though the discharge does not actually appear at the usual periods, there are often, at those periods, some marks of an effort, having a tendency to produce the discharge; it is, therefore, at those times especially, when the efforts of the system concur, that we ought to resort to the remedies for curing a suppression. These concurring efforts are indicated by the existence of pain in the loins, with a sense of fulness in the region of the uterus, and other symptoms which usually indicate the approach, or accompany the flow of the catamenia in the healthy condition.

The cases in which the menses flow after longer intervals, and in less quantity than usual, are proximate to the cases of actual suppression; and when they are attended with any of the disorders of the system before alluded to, they are to be treated by the same remedies as the cases of entire suppression. See Cullen, First Lines, par. 1007—1012.

The partial impediment to the flow of the menses, which is accompanied with considerable pain, (the *Amenorrhœa difficilis*, spec. 3. of Cullen,) has been treated of under the more common appellation, *Dysmenorrhœa*; which see.

MENSGUT, in *Geography*, a town of Prussia, in the province of Oberland; eight miles N. of Ortelzburg.

MENSHIE, or MEDCHIE, a town of Egypt; five miles N. of Girgê. The markets of this town are always well supplied, because the boats that are bound to the N. of Egypt, are accustomed to put in here for a stock of provisions. A conserve of wheat is sold here, which is highly valued in the country. It is composed of corn steeped in water for two days, then dried in the sun, and boiled to the thickness of a jelly: the paste thus prepared is called "chede" dew: it is sweet and nutritive. Menshié is decorated with a large mosque. "Ptolemais Hermei," or Hermes, so called because the symbolical deity Mercury was worshipped there, a large and populous city, formerly stood south of this spot and near it. A few scattered ruins, and a stone-dike to confine the waters of the river, are the only remains which Menshié preserves of its ancient splendour. Sonnini.

MENSIS. See MONTH.

MENSIS *Chymicus*. See MENSTRUUM.

MENSIS *Vetitus*. See FENCE-Month.

MENSOORIA, in *Geography*, a castle of the empire of Morocco, eight leagues from Rabat, in the province of Temfena, or Tremecen, built in the 12th century, by Jacob Almanzor, to afford an asylum to travellers during the night; the inhabitants of the surrounding country being a mischievous and thieving people.

MENSORES, among the Romans, harbingers or officers, whose business it was to go and fix upon lodgings for the emperor, when he took a journey to any of the provinces. Their office was also to mark out encampments, and assign every regiment its post.

MENSORES also signified land-surveyors, architects, or appraisers of houses and public buildings. Those likewise who distributed the provisions in the army, were called *mensores frumentarii*; and servants who waited at table had the appellation of *mensores*.

MENSORES was likewise the title of officers among the Romans appointed to receive the provisions brought to the city by sea, and to see them carefully laid up and preserved in public granaries, of which there were great numbers.

MENSTRUAL, or MENSTRUOUS, a term in *Medicine*, applied to the blood which flows from women in their ordinary monthly purgations. See MENSES.

MENSTRUAL *Epactis*. See EPACT.

MENSTRUAL *Longitude of the Moon*. See ARGUMENT.

MENSTRUATION, EXCESSIVE. See MENORRHAGIA.

MENSTRUATION, *Painful*. See DYSMENORRHEA.

MENSTRUUM, SOLVENT, or DISSOLVENT, in *Chemistry*, any liquor that will dissolve, that is, separate the parts of hard bodies

The term takes its rise from this, that some chemists pretend the complete dissolution of a mixed body cannot be effected in less than forty days; which period they call a *philosophical month*. See SOLVENT, and also SOLUTION.

MENSTRUUM, *Universal*. See ALKALIST.

MENSTRUUM, in *Pharmacy*, chiefly denotes a body that will extract the virtues of ingredients by infusion, decoction, or the like. See EXTRACT, INFUSION, and DECOCTION.

MENSURATION is that branch of mathematics which is employed in ascertaining the extension, solidities, and capacities of bodies; and in consequence of its very extensive application to the various purposes of life, it may be considered as one of the most useful and important of all the mathematical sciences: in fact, mensuration, or geometry, which were anciently nearly synonymous terms, seem to have been the root whence all the other exact sciences, with the exception of arithmetic, have derived their origin.

As soon as men began to form themselves into society, and direct their attention towards the cultivation of the earth, it became necessary to have some means of distinguishing one person's allotment from another, both as to position and quantity; as it did to enumerate the number of their flocks and herds; and hence, in all probability, the former gave rise to the science of mensuration, as the latter did to that of arithmetic; and though we may easily imagine that each of them remained for ages in a rude uncultivated state, yet it is from this period that we must date their commencement; and therefore, to state the precise time when they were discovered, or by whom they were first introduced, would be to trace out the origin of society itself: on this head, therefore, we shall barely observe that in all probability they first arose from the humblest efforts of unassisted genius, called forth by the great mother of invention, Necessity; and that they have since grown up by slow and imperceptible degrees, till they have at length acquired the dignity of the most perfect sciences; as the acorn which is first accidentally sown in a field, is in due course of time converted into the majestic oak.

But notwithstanding we cannot attribute the invention of the science of mensuration to any particular person, or nation, yet we may discover it in an infant state, rising as it were into a scientific form amongst the ancient Egyptians; and hence the honour of the discovery has frequently been given to this people, and to the circumstance of the overflowing of the Nile.

It is, however, to the Greeks that we must consider ourselves indebted for having first embodied the leading principles of this art into a regular system. Euclid's Elements of Geometry were probably first wholly directed to this subject, and many of those beautiful and elegant geometrical properties, which are so much and so justly admired, it is not unlikely arose out of simple investigations directed solely to the theory and practical application of mensuration. These collateral properties, when once discovered, soon gave rise to others of a similar kind, and thus geometry, which was first instituted for a particular and limited purpose, became itself an independent and important science, which has perhaps done more towards harmonizing and expanding the human faculties, than all the other sciences united.

But notwithstanding the perfection which Euclid attained in geometry, the theory of mensuration was not in his time advanced beyond what related to right-lined figures, and

this, so far as regards surfaces, might all be reduced to that of measuring a triangle; for as all right-lined figures may be reduced to a number of trilaterals, it was only necessary to know how to measure these, in order to find the surface of any other figure whatever bounded only by right lines. The mensuration of solid bodies, however, was of a more varied and complex nature, and gave this celebrated geometrician a greater scope for the exercise of his superior talents, and still confining himself to bodies bounded by right-lined plane superficies, he was able to perform all that can be done even at this day. With regard to curvilinear figures, he attempted only the circle and the sphere, and if he did not succeed in those, he failed only where there was no possibility of success; but the ratio that such surfaces and solids have to each other he accurately determined.

After Euclid, Archimedes took up the theory of mensuration, and carried it to a much greater extent. He first found the area of a curvilinear space, unless indeed we except the lunules of Hippocrates, which required no other aid than that of the geometrical elements. Archimedes found the area of the parabola to be two-thirds of its circumscribing rectangle, which, with the exception above stated, was the first instance of the quadrature of a curvilinear space. The conic sections were at this time but lately introduced into geometry, and they did not fail to attract the particular attention of this celebrated mathematician, who discovered many of their very curious properties and analogies. He likewise determined the ratio of spheres, spheroids, and conoids, to their circumscribing cylinders, and has left us his attempt at the quadrature of the circle. He demonstrated that the area of a circle is equal to the area of a right-angled triangle, of which one of its sides about the right angle is equal to the radius, and the other equal to the circumference, and thus reduced the quadrature of the circle to that of determining the ratio of the circumference to the diameter, a problem which has engaged the particular attention of the most celebrated mathematicians of all ages, but which remains at present, and in all probability ever will remain, the desideratum of geometricians, and at the same time a convincing and humiliating proof of the limited powers of the human mind.

But notwithstanding Archimedes failed in establishing the real quadrature of the circle, it is to him we are indebted for the first approximation towards it. He found the ratio between the diameter of a circle, and the periphery of a circumscribed polygon of 96 sides, to be less than 7 to 22, or less than 1 to $3\frac{1}{7}$; but the ratio between the diameter, and periphery of an inscribed polygon of the same number of sides, he found to be greater than 1 to $3\frac{1}{7}$; whence, *à fortiori*, the diameter of a circle is to its circumference in a less ratio than 1 to $3\frac{1}{7}$, or less than 7 to 22. Having thus established this approximate ratio between the circumference and diameter, that of the area of the circle to its circumscribed square, is found to be nearly as 11 to 14. Archimedes, however, makes the latter the leading proposition. These, it is true, are but rude approximations, compared with those that have been since discovered, but considering the state of science at this period, particularly of arithmetic, we cannot but admire the genius and perseverance of the man, who, notwithstanding the difficulties that were opposed to him, succeeded in deducing this result, which may be considered as having led the way to the other more accurate approximations which followed, most of which, till the invention of fluxions, were obtained upon similar principles to those employed by this eminent geometrician.

Archimedes also determined the relation between the circle and ellipse, as well as that of their similar parts; besides

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which figures he has left us a treatise on the spiral, a description of which will be given under that article. See SPERAL.

Some advances were successively made in geometry and mensuration, though but little novelty was introduced into the mode of investigation till the time of Cavalieri. Till his time the regular figures circumscribed about the circle, as well as those inscribed, were always considered as being limited both as to the number of their sides, and the length of each. He first introduced the idea of a circle being a polygon of an infinite number of sides, each of which was of course indefinitely small; solids were supposed to be made up of an infinite number of sections indefinitely thin, &c. This was called the doctrine of indivisibles, which was very general in its application to a variety of difficult problems, and by means of it many new and interesting properties were discovered; but it unfortunately wanted that distinguishing characteristic which places geometry so pre-eminent amongst the other exact sciences. In pure elementary geometry we proceed from step to step, with such order and logical precision, that not the slightest doubt can rest upon the mind with regard to any result deduced from those principles; but in the new method of considering the subject, the greatest possible care was necessary in order to avoid error, and frequently this was not sufficient to guard against erroneous conclusions. But the facility and generality which it possessed, when compared with any other method then discovered, led many eminent mathematicians to adopt its principles, and of these Huygens, Dr. Wallis, and James Gregory, were the most conspicuous, being all very fortunate in their application of the theory of indivisibles. Huygens, in particular, must always be admired for his solid, accurate, and masterly performances in this branch of geometry. The theory of indivisibles was however disapproved of by many mathematicians, and particularly by Newton, who, amongst his numerous and brilliant discoveries, has given us that of the method of fluxions, the excellency and generality of

which immediately superseded that of indivisibles, and revived some hopes of squaring the circle, and accordingly its quadrature was again attempted with the greatest eagerness. The quadrature of a space and the rectification of a curve, was now reduced to that of finding the fluent of a given fluxion; but still the problem was found to be incapable of a general solution in finite terms. The fluxion of every fluent was found to be always algebraical, but the converse proposition, viz. of finding the fluent of a given fluxion, could only be effected in particular cases, and amongst these exceptions, to the great disappointment and regret of geometers, was included the case of the circle, with regard to all the forms of fluxions under which it could be obtained.

At length all hopes of accurately squaring the circle, and some other curves being abandoned, mathematicians began to apply themselves to finding the most convenient series for approximating towards their true lengths and quadratures; and the theory of mensuration now began to make rapid progress towards perfection. Many of the rules, however, were given in the Transactions of learned societies, or in separate and detached works, till at length Dr. Hutton formed them into a complete treatise, entitled "A Treatise on Mensuration," in which the several rules are all demonstrated, and some new ones introduced. Mr. Bonnycastle also published a very complete work on this subject, entitled "An Introduction to Mensuration." These may be considered as standard works, and the only ones of importance in our language, though there are others on the same subject, as Hawney's and Robertson's, the latter of which only requires the demonstrations of the several rules, which are omitted, in order to render it also a very useful and valuable performance.

To the above slight sketch of the history and progress of this science, we shall annex a synopsis of the principal rules, drawn from the works above mentioned, which will be found very useful as a reference in a variety of cases.

SYNOPSIS OF THE PRINCIPAL RULES OF MENSURATION.

TRIANGLES.

Let a, b, c represent the three sides of the triangle, A, B, C the angles opposite to those sides respectively; p the perpendicular falling upon the base b ; then,

1. The area = $\frac{1}{2} p b$
2. — = $\frac{1}{2} a b \sin C = \frac{1}{2} a c \sin B = \frac{1}{2} b c \sin A$.

Make $a + b + c = s$; then,

3. The area = $\sqrt{\left\{ \frac{1}{2} s \left(\frac{1}{2} s - a \right) \left(\frac{1}{2} s - b \right) \left(\frac{1}{2} s - c \right) \right\}}$
4. Log. area = $\frac{1}{2} \left\{ \log. \frac{1}{2} s + \log. \left(\frac{1}{2} s - a \right) + \log. \left(\frac{1}{2} s - b \right) + \log. \left(\frac{1}{2} s - c \right) \right\}$.

TRAPEZIUMS.

Let a, b, c, d , represent the four sides, a and c, b and d , being those which are opposite to each other, δ and δ' the two diagonals, M the angle formed by their intersection, also p, p' , the perpendiculars falling from two opposite angles on the diagonal δ ; then,

1. The area = $\frac{1}{2} \delta (p + p')$
2. — = $\frac{1}{2} \delta \delta' \sin M$

3. The area = $\left\{ (a^2 + c^2) \wedge (b^2 + d^2) \right\} \tan. M$.

If the trapezium be inscribable in a circle,

4. The area = $\sqrt{\left\{ (s - a) (s - b) (s - c) (s - d) \right\}}$
5. — = $(ab + cd) \sin. N$.

where N is the angle contained by a and b , or by c and d .

If a and c , or b and d , be parallel, and p their perpendicular distance, then,

6. The area = $\frac{1}{2} p (c + a)$, or $\frac{1}{2} p (b + d)$.

REGULAR POLYGONS.

Let s represent one of the equal sides, n the number of sides, p the perpendicular falling from the centre of the polygons upon one of the sides; then,

1. The area = $\frac{1}{2} p s n$
2. — = $n p^2 \tan. \frac{360^\circ}{2n}$
3. — = $\frac{1}{2} n s^2 \cotan. \frac{360^\circ}{2n}$

This last general formula resolves itself into the following particular ones, viz.

M m 2

4. Trigon

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	Sides.	Area		
4. Trigon	3	—	$s^2 \times$	0.4330127
5. Tetragon	4	—	$s^2 \times$	1.0000000
6. Pentagon	5	—	$s^2 \times$	1.7204774
7. Hexagon	6	—	$s^2 \times$	2.5980762
8. Heptagon	7	—	$s^2 \times$	3.6399124
9. Octagon	8	—	$s^2 \times$	4.8284271
10. Nonagon	9	—	$s^2 \times$	6.1818242
11. Decagon	10	—	$s^2 \times$	7.6942688
12. Undecagon	11	—	$s^2 \times$	9.3656399
13. Dodecagon	12	—	$s^2 \times$	11.1961524

CIRCLE.

Let r represent the radius, d the diameter, c the circumference, and a the area; then,

1. The area = $\frac{1}{4} c d$
2. — = $d^2 \times .7854$
3. — = $c^2 \times .07958$
4. The circumference = $d \times 3.14159$

If we make $3.14159 = p$, we have the following relation of the above quantities; viz.

1. — , $d = \frac{c}{p} = \frac{4a}{c} = 2 \sqrt{\frac{a}{p}}$
2. — $c = p d = \frac{4a}{d} = 2 \sqrt{p a}$
3. — $a = \frac{p d^2}{4} = \frac{c^2}{4p} = \frac{d c}{4}$
4. — $p = \frac{c}{d} = \frac{4a}{d^2} = \frac{c^2}{4a}$

CIRCULAR ARCS.

The former notation remaining, let s represent the sine, and v the versed sine of the half arc; also let m represent the measure of the arc in degrees, minutes, &c. then,

1. The arc = $r m \times .0174533$.

$$2. \text{ The arc} = \begin{cases} 2 \sqrt{d v} \times \left\{ 1 + \frac{v}{2.3 d} + \frac{3 v^2}{2.4 5 d^2} + \frac{3.5 v^3}{2.4 6.7 d^3} + \&c. \right\} \text{ or,} \\ 2 d \sqrt{q} + \frac{q}{2.3} A + \frac{3^2 q}{4.5} B + \frac{5^2 q}{6.7} C + \frac{7^2 q}{8.9} D \end{cases}$$

where $q = \frac{v}{d}$; and A, B, C, &c. are the 1st, 2d, 3d, &c. terms.

$$3. \text{ The arc} = \begin{cases} 2 s \times \left\{ 1 + \frac{s^2}{3.3 r^2} + \frac{3 s^4}{5.2.4 r^4} + \frac{3.5 s^6}{7.2.4 r^6}, \&c. \right\} \text{ or,} \\ 2 s + \frac{q}{2.3} A + \frac{3^2 q}{4.5} B + \frac{5^2 q}{6.7} C + \frac{7^2 q}{8.9} D, \&c. \end{cases}$$

where $q = \frac{s^2}{r^2}$; and A, B, C, D, &c. the preceding terms.

To which may be added the following approximations:

4. The arc = $2 d \sqrt{\frac{3 v}{3 d - v}}$ nearly.
5. — = $2 \times \left\{ 5 d \sqrt{\frac{5 v}{5 d - 3 v}} + 4 \sqrt{d v} \right\}$ nearly.
6. — = $\frac{8 c' - C'}{3}$ nearly.

where C' is the chord of the whole arc, and c' the chord of half the arc.

CIRCULAR SECTORS.

Let l represent the length of the arc of the sector, and m its measure in degrees, minutes, &c.; then,

1. Area of sector = $\frac{1}{2} r l$
2. — = $.7854 d^2 \times \frac{m}{360}$

CIRCULAR SEGMENTS.

If A' represent the area of the circular sector, and C' the chord of the arc; then,

1. Area of segment = $A' - \frac{1}{2} C' (r - v)$.
2. Area = $\begin{cases} 2 v \sqrt{d v} \times \left\{ \frac{2}{3} - \frac{v}{5 d} - \frac{v^2}{28 d^2} - \frac{v^3}{72 d^3} - \&c. \right\} \text{ or,} \\ 2 \sqrt{d v} \times \left\{ \frac{2}{3} - \frac{3 v}{5.2 d} A - \frac{5 v}{7.4 d} B - \frac{7.3 v}{9.6 d} C - \frac{9.5 v}{11.8 d} D \right\} \end{cases}$

A, B, C, &c. being the preceding terms.

$$3. \text{ Area} = \frac{1}{3} v \sqrt{v V} + \frac{5}{5} V A - \frac{1}{7} V B + \frac{3}{9} V C - \frac{5}{11} V D, \&c. \text{ where } V = (d - v).$$

$$4. \text{ Area} = 2 r c'' - \frac{1}{2.3} q^2 A - \frac{1.3}{4.5} q^2 B - \frac{3.5}{6.7} q^2 C, \&c. \text{ where } c'' \text{ represents the cosine of half the arc, and } q = \frac{c''}{r}, A, B, C, \&c. \text{ being the preceding terms.}$$

To which may be added the following approximations, viz.

5. Area = $\frac{2}{3} \left\{ \sqrt{(d v - v^2)} + \frac{2}{3} \sqrt{d v} \right\}$ nearly.
6. Area = $\frac{2}{3} v (d v - \frac{2}{3} v^2)$ nearly.
7. Area = $\frac{1}{10} v (C' + \frac{2}{3} c)$ nearly.
8. Area = $\frac{2}{3} v \sqrt{(\frac{1}{4} C'^2 + \frac{2}{3} v)}$ nearly.
9. Area = $d^2 \times$ tabular number answering to $\frac{v}{d}$, in the table of circular segments.

Note.—The area of circular zones will be found by finding the difference of the two segments; and the area of circular rings, by finding the difference of the areas of the two circles.

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Or by making D and d the diameters, then

1c. Area of the ring = $(D + d) (D - d) \times .7854$.

ELLIPTIC

Let t represent the semi-transverse axis, c the semi-conjugate, x any absciss, y the corresponding ordinate, and ρ the parameter; then will these quantities have the following relations, *viz.*

1. Ordinate (y) = $\frac{c}{t} \sqrt{(2tx - x^2)}$
2. Absciss (x) = $t + \frac{t}{c} \sqrt{(c^2 - y^2)}$
3. Conjugate (c) = $\frac{ty}{\sqrt{(2tx - x^2)}}$
4. Transverse (t) = $\frac{c^2 x}{y^2} \times \left\{ c \mp \sqrt{(c^2 - y^2)} \right\}$
5. Parameter (ρ) = $\frac{c^2}{t}$.

The same formulæ obtain for any pair of conjugate diameters.

Make $1 - \frac{c^2}{t^2} = m$; then,

1. Elliptic circum. = $C \times \left\{ 1 + \frac{m}{2} - \frac{3m^2}{2 \cdot 4^2} - \frac{3 \cdot 5 m^3}{2 \cdot 4 \cdot 6^2} - \frac{3 \cdot 5 \cdot 7 m^4}{2 \cdot 4 \cdot 6 \cdot 8^2}, \&c. \right\}$ where C is the circumference of the circumscribing circle.

2. Elliptic circum. = $(t + c) \times 3.1416$ nearly.

3. ——— = $3.1416 \times \sqrt{2(t^2 + c^2)}$ nearer.

4. ——— = $\frac{1}{2} \left\{ 3 \sqrt{2(t^2 + c^2)} - \frac{6t + \rho}{4} \right\} \times 3.1416$ still nearer.

5. Elliptic circum. = $\frac{1}{2} \left\{ 5 \sqrt{2(t^2 + c^2)} - \frac{35t + 7\rho}{8} + \frac{\rho^2 c^2}{16t^2} \right\} \times 3.1416$.

6. Elliptic circum. = $\frac{1}{2} \left\{ t + c + \sqrt{2(t^2 + c^2)} \right\} \times 3.1416$.

7. Elliptic area = $3.14159 \times t c$.

8. ——— = $3.14159 \times t c \times \sin.$ angle of intersection, in which last expression t and c are any pair of semi-conjugate diameters.

ELLIPTIC ARCS.

Let t represent still the semi-transverse, c the semi-conjugate, and z the distance of the ordinate from the centre; then the arc bounded by the ordinate, and the parallel axis, will be

1. Elliptic arc = $z \left\{ 1 + \frac{c^2}{6t^2} z^2 + \frac{4t^2 c^2 - c^4}{40t^4} z^4 + \frac{8t^4 c^2 - 4t^2 c^4 + c^6}{112t^6} z^6, \&c. \right\}$

Make $\frac{t^2 - c^2}{t^2} = q$; then,

2. Elliptic arc = $z \sqrt{\frac{t^2 - \frac{1}{3} q z^2}{t^2 - \frac{1}{3} q z^2}}$ nearly.

3. ——— = $\frac{1}{2} \left\{ q z \sqrt{\frac{t^2 - \frac{1}{3} q z^2}{t^2 - \frac{1}{3} q z^2}} - \left(1 + \frac{c^2 z^2}{6t^2} \right) 4 z \right\}$

4. Elliptic arc = $\frac{15\rho C + (17C - 21\rho)y}{15\rho C + (9C - 21\rho)y}$ nearly, C being the whole axis, where the arc is 180° ; and ρ, x , and y the corresponding parameter, absciss, and ordinate.

ELLIPTIC SEGMENTS.

Find the area of the circular segment described on that axis to which the base of the segment is perpendicular, and call it A ; then,

1. As this axis : the other axis :: A : the elliptic segment, make the height of the segment = b , and vertical axis of the ellipse = v , also put $\frac{b}{v} = q$; then,

2. Elliptic seg. = $t c \times$ tabular number answering to q in a table of circular segments.

PARABOLA.

Make any absciss = x , ordinate = y , parameter = ρ , and area = a ; then will these quantities have the following relations, *viz.*

1. Parameter (ρ) = $\frac{y^2}{x}$
2. Absciss (x) = $\frac{y^2}{\rho}$
3. Ordinate (y) = $\sqrt{\rho x}$
4. Area contained between x, y , and the curve } (a) = $\frac{2}{3} x y$.

PARABOLIC ARCS

Make $\frac{2y}{\rho} = g$, and $\sqrt{(1 + g^2)} = s$; then,

1. Parabolic arc = $\frac{1}{2} \rho \cdot \left\{ g s + \text{hyp. log. } (g + s) \right\}$
2. Parabolic arc = $\left\{ \begin{aligned} &2y \left(1 + \frac{g^2}{2 \cdot 3} - \frac{g^4}{2 \cdot 4 \cdot 5} + \frac{3g^6}{2 \cdot 4 \cdot 6 \cdot 7} \right. \\ &\quad \left. - \frac{3 \cdot 5 g^8}{2 \cdot 4 \cdot 6 \cdot 8 \cdot 9}, \&c. \right\} \\ &2y \left(1 + \frac{g^2}{2 \cdot 3} A - \frac{1 \cdot 3 g^4}{4 \cdot 5} B + \right. \\ &\quad \left. \frac{3 \cdot 5 g^6}{6 \cdot 7} C - \frac{5 \cdot 7 g^8}{8 \cdot 9} D, \&c. \right\} \end{aligned}$

where A, B, C , &c. represent the preceding terms. To which may be added the following approximations:

3. Parabolic arc = $2 \sqrt{(y^2 + \frac{1}{3} x^3)}$ nearly.
4. ——— = $\frac{2}{3} \left\{ \sqrt{(y^2 + \frac{1}{3} x^3)} - \frac{y^2 + \frac{1}{3} x^3}{\frac{1}{4} y} \right\}$ nearly.

PARABOLIC FRUSTUM, OR ZONE.

Let D and d represent the two ends, and a the perpendicular distance between them; then,

1. Area of zone = $\frac{2}{3} a \times \frac{D^3 - d^3}{D^2 - d^2}$

When $d = 0$, the area becomes $\frac{2}{3} a D$.

HYPERBOLA.

Let t = the semi-transverse diameter, c = the semi-conjugate, x any absciss, and y its corresponding ordinate; then will these quantities have the following relations, *viz.*

1. Ordinate (y) = $\frac{c}{t} \sqrt{(2tx + x^2)}$

2. Absciss

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2. Abfcifs - $(x) = t \pm \frac{t}{2c} \sqrt{(c^2 + y^2)}$

3. Conjugate $(c) = \frac{ty}{\sqrt{(2tx + x^2)}}$

4. Diameter - $(t) = \frac{cx}{y} \left\{ \sqrt{(c^2 + y^2)} \pm c \right\}$

Making $\frac{t^2 + c^2}{c^2} = q$, and hyp. log. $\frac{y + \sqrt{(c^2 + y^2)}}{c}$

= A.

Also, $\frac{1}{2} \left\{ y \sqrt{(c^2 + y^2)} - c^2 A \right\} = B.$

$\frac{1}{4} \left\{ y^3 \sqrt{(c^2 + y^2)} - 3c^2 B \right\} = C.$

$\frac{1}{6} \left\{ y^5 \sqrt{(c^2 + y^2)} - 5c^2 C \right\} = D.$

&c. &c. &c.

HYPERBOLIC ARCS.

Let t and c be any femi-diameter and its conjugate as before; and y the ordinate which limits the arc to be measured from the vertex; then,

The length of the arc contained between the vertex and ordinate will be,

1. Arc = $c \times \left\{ A + \frac{q}{2} B - \frac{q^2}{2 \cdot 4} C + \frac{3q^3}{2 \cdot 4 \cdot 6} D - \frac{3 \cdot 5 q^4}{2 \cdot 4 \cdot 6 \cdot 8} E, \&c. \right\}$

2. Arc = $y \times \left\{ 1 + \frac{t^2 y^2}{6c^2} - \frac{(t^4 + 4t^2 c^2) y^4}{40c^4} + \frac{(t^6 + 4t^4 c^2 + 8t^2 c^4) y^6}{112c^6} - \frac{(5t^8 + 24t^6 c^2 + 48t^4 c^4 + 64t^2 c^6) y^8}{1152c^8}, \&c. \right\}$

3. Arc = $y \left\{ 1 + \frac{t^2 y^2}{6c^2} A - \frac{t^2 + 4c^2}{c^2} \cdot \frac{3y^3}{20} B + \frac{t^4 + 4t^2 c^2 + 8c^4}{t^2 + 4c^2} \cdot \frac{5y^5}{14c^4} C - \frac{5t^6 + 24t^4 c^2 + 48t^2 c^4 + 64c^6}{t^4 + 4t^2 c^2 + 8c^4} \cdot \frac{7y^7}{72c^4} D \&c. \right\}$

To which may be added the following approximation :

4. Arc = $\frac{120c^2 t + (19t^2 + 21c^2) \cdot 4x}{120c^2 t + (9t^2 + 21c^2) \cdot 4x} + y$, nearly.

HYPERBOLIC SEGMENTS.

Let t and c still represent the femi-diameter and its conjugate, x an abfcifs, $2y$ the double ordinate, which cuts off the segment, and z its distance from the centre; then,

1. Hyp. area = $zy - tc \times \text{hyp. log. of } \frac{ty + cz}{tc}$.

Making $\frac{x}{2t+x} = q$, we have

2. Hyp. area = $2xy \left\{ \frac{1}{3} - \frac{q}{1 \cdot 3 \cdot 5} - \frac{q^2}{3 \cdot 5 \cdot 7} - \frac{q^3}{5 \cdot 7 \cdot 9} \right.$

— &c. $\left. \right\}$

3. Hyp. area = $2xy \left\{ \frac{1}{3} - \frac{1}{5} A q - \frac{1}{7} B q - \frac{1}{9} C q \right.$

— &c. $\left. \right\}$

where A, B, C, &c. represent the preceding terms. To which may be added the following approximations, viz.

4. Hyp. area = $\frac{4cx}{15t} \left\{ 4 \sqrt{(2tx + \frac{3}{4}x^2)} + \sqrt{2tx} \right\}$ nearly.

5. Hyp. area = $\frac{4cx}{75t} \left\{ 21 \sqrt{(2tx + \frac{5}{7}x^2)} + 4 \sqrt{2tx} \right\}$ nearly.

HYPERBOLIC FRUSTUM, OR ZONE.

The same notation remaining as above, let z be the distance of a second double ordinate $2Y$; then,

1. The area of zone contained between $2y$ and $2Y$ - $\left\{ \begin{array}{l} ZY - zy - tc \times \text{hyp. log.} \\ \frac{tY + cZ}{ty + cz} \end{array} \right.$

PRISMS and CYLINDERS.

Let p represent the perimeter of the base, a its area, and b the height or perpendicular altitude; then,

1. Surface = $pb + 2a$

2. Solidity = ab .

PYRAMIDS and CONES.

Let p , a , and b , represent, as above, the perimeter, area and altitude; then,

1. Surface = $\frac{1}{2}pb + a$

2. Solidity = $\frac{1}{3}ab$.

The latter rule obtains also in oblique cones and pyramids.

FRUSTUMS of CONES and PYRAMIDS.

Let A and a represent the areas of the two ends, P and p their perimeters, and b the altitude of the body; then,

1. Surface = $\frac{1}{2}b(P + p) + (A + a)$

2. Solidity = $\frac{1}{3}b(A + a) + \frac{1}{3}b(\sqrt{Aa})$.

If the ends are circles, or regular polygons, by putting D and d for the diameters, and C and c for the circumferences in the former case; also S and s for the sides of the polygon in the latter, and T for the tabular number answering to any particular polygon; then,

4. Solidity of frust. cone = $\frac{1}{3}b(D^2 + Dd + d^2) \cdot 7854$.

5. ——— frust. cone = $\frac{1}{3}b(C^2 + Cc + c^2) \cdot 07958$.

6. ——— frust. pyra. = $\frac{1}{3}b(S^2 + Ss + s^2) T$.

PRISMOID.

Let A and a represent the areas of the two ends, a the area

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area of the middle section, and l the length of the solid; then,

1. Solidity = $\frac{1}{6} l (\Lambda + 4a + a)$.

WEDGE.

Make L the length of the base, l the length of the edge, b the breadth of the base, and h the height of the wedge; then,

1. Solidity = $\frac{1}{6} h b (L + l)$.

CYLINDRIC UNGULA.

When the plane passes through the base of the cylinder.

Make the altitude = H , the base = b , $\frac{1}{2}$ arc of base = a , the sine, cosine, and versed sine of $\frac{1}{2}$ arc = s , c , and v , and diameter of cylindrical base = d ; then,

1. Curve surf. ungula = $\frac{(ds - ac) H}{v}$

2. Solidity ungula = $\frac{(s - bc) H}{v}$.

When the cutting plane does not pass through the base.

Put, in addition to the above notation, h for the least height of the ungula, H still representing the greater height; then,

1. Curve surface = $\frac{1}{2} (H + h) \times 3.1416 d$

2. Solidity = $\frac{1}{6} (H + h) \times .7854 d^2$

3. ——— = $\frac{1}{2} (H + h) \times .07958 c^2$

where c is the circumference of the cylinder.

CONIC UNGULA.

When the cutting plane passes through the opposite ends of the frustum.

Make the diameter of the greater end = D , of the less end = d , and altitude = h ; then,

1. Solidity gt. hoof = $\frac{D - d \cdot D d}{D - d} \times .2618 D h$

2. ——— lt. hoof = $\frac{D \sqrt{D d - d^2}}{D - d} \times .2618 D h$

3. Differ. of hoofs = $\frac{(D_1 - d)^2}{D - d} \times .2618 h$.

SPHERE, OR GLOBE.

Let d represent the diameter, c the circumference, s the surface, and S the solidity of the sphere; then,

1. Surface (s) = $c d$
2. ——— (s) = $3.1416 d^2$
3. ——— (s) = $.3183 c^2$
4. Solidity (S) = $\frac{1}{6} s d$
5. ——— (S) = $.01688 c^3$
6. ——— (S) = $.5236 d^3$.

SPHERICAL SEGMENTS AND ZONES.

The same notation remaining, let r represent the radius of the base of the segment, and h its height; then,

1. Surface of seg. = $3.1416 d h$
2. Solidity of seg. = $.5236 h (3 r^2 + h^2)$
3. ——— = $.5236 h (3 d - 2 h)$.

For the zone, put R and r for the two radii of its ends, and h its altitude; then,

4. Surface of zone = $3.1416 d h$
5. Solidity = $1.5708 h (R^2 + r^2 + \frac{1}{3} h^2)$.

CIRCULAR SPINDLE.

Put l = $\frac{1}{2}$ length of the spindle, m = $\frac{1}{2}$ its middle diameter, a the length of the generating arc, and Λ the area of generating segment.

Make $\frac{l + m^2}{s m} = r$; then,

1. Surface of spindle = $2 \left\{ l r - a (r - m) \right\} \times 3.1416$

2. Solidity = $4 \left\{ l^3 - \frac{1}{2} \Lambda (r - m) \right\} \times 3.1416$

For the middle zone of a circular spindle, make L = $\frac{1}{2}$ the length of the spindle, l = $\frac{1}{2}$ the length of the zone, Λ the generating area, r and m being the same as above; then

3. Solidity of zone = $2 \left\{ (L - \frac{1}{2} l) l - \Lambda (r - m) \right\} \times 3.1416$

THE REGULAR BODIES.

Let S represent the side or edge of one of the equal faces; then,

1. Tetraedron { Surf. = $s^2 \times 1.73205 = s^2 \sqrt{3}$
Solid. = $s^3 \times 0.11785 = \frac{1}{12} s^3 \sqrt{2}$

2. Hexaedron { Surf. = $s^2 \times 6.00000 = 6 s^2$
Solid. = $s^3 \times 1.00000 = s^3$

3. Octaedron { Surf. = $s^2 \times 3.46410 = 2 s^2 \sqrt{3}$
Solid. = $s^3 \times 0.47140 = \frac{1}{6} s^3 \sqrt{2}$

4. Dodecaedron { Surf. = $s^2 \times 20.64578 = 15 s^2$
Solid. = $s^3 \times 7.66312 = 5 s^3$

5. Icofaedron { Surf. = $s^2 \times 8.66025 = 5 s^2 \sqrt{3}$
Solid. = $s^3 \times 2.18169 = \frac{1}{2} s^3$

SPHEROID.

Let f denote the fixed axis, and r the revolving axis; then making $3.1416 = p$, and $\frac{f^2 s r^2}{f^2} = q$; we have

1. Solidity = $\frac{1}{6} f r^2 p$

2. Surface = $f r p \left\{ 1 \mp \frac{\Lambda q}{2.3} - \frac{3 B q}{4.5} \mp \frac{3.5 C q}{6.7} \right.$

$\left. - \frac{5.7 D q}{8.9}, \&c. \right\}$ the upper sign having place in the oblong spheroid, and the lower sign in the oblate spheroid.

If, also, we make $\frac{r}{f} = z$, $\sqrt{1 - z^2} = s$, m = the measure in degrees of the arc whose sine is s ; likewise

$P = 0.1745329 m$ in the oblong spheroid,

$P = 2.30285 \log. (s + z)$ in the oblate spheroid; then

3. Surface = $\frac{P f + r s}{2 s} \times 3.1416 r$.

FRUSTUMS OF SPHEROIDS.

Let f represent the fixed axis, and r the revolving one; $3.1416 = p$, $\frac{f^2 s r^2}{f^2} = q$; h the height of the frustum,

$\frac{4 q h^2}{f^2} = z$; then the frustum being cut off by two planes

perpendicular to the fixed axis, one of those planes passing through the centre of the spheroid, we shall have

1. Surface = $p r h \left\{ 1 \pm \frac{\Lambda z}{2.3} - \frac{3 B z}{4.5} \pm \frac{3.5 C z}{6.7} \right.$

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$\frac{5.7Dz}{8.9}$, &c. } where A, B, C, &c. are the preceding

terms, and the upper or under sign is to be used, according as it is the oblate or oblong spheroid.

For the solidity, make the diameter of the greater end = D, of the less end = d; then

2. Solidity = $\frac{1}{12} (2D^2 + d^2) b \times 3.1416$.

If the frustum be cut off by planes, one of which passes through the fixed axis, and the other parallel to it; then putting T the transverse axis, and C the conjugate of the greater end; and t and c for those of the less end;

3. Solidity = $\frac{1}{12} (2TC + tc) b \times 3.1416$.

Note — For the whole middle frustum the above results must be doubled.

SEGMENTS of SPHEROIDS.

Let f denote the fixed axis; r the revolving axis; b the height of the segment; then

1. When the base is parallel to the revolving axis.

Solidity = $\frac{r^2}{f^2} (3f \text{ vers } 2b) b^2 \times .5236$.

2. When the base is perpendicular to the revolving axis.

Solidity = $\frac{r^2}{f^2} (3r \text{ vers } 2b) b^2 \times .5236$

ELLIPTIC SPINDLES.

Put the perpendicular axis of the ellipse = a; the parallel axis = b; length of the spindle = l; distance of the centre of the spindle and ellipse = C; and area of the generating segment = A; then

1. Solidity = $1.57078 \times \left\{ \frac{a^2 l^3}{3 b^2} - 4 c A \right\}$

2. Solidity = $\frac{2}{3} l \times .7854 \left\{ D^2 - 4c \left(\frac{3A}{l} - D \right) \right\}$

where D is the greatest diameter of the spindle.

PARABOLOID.

Let y represent the ordinate or semi-diameter of the base; x the altitude of the solid; $3.1416 = p$; then

1. Surface = $\frac{2 p y}{12 x^2} \left\{ (y^2 + 4 x^2)^{\frac{3}{2}} - y^3 \right\}$

2. Solidity = $\frac{1}{2} p y^2 x$.

FRUSTUMS of PARABOLOIDS.

Let D denote the greater diameter, d the less; P the parameter; and b the height of the frustum; then

1. Surface = $\frac{(P^2 + D)^{\frac{3}{2}} - (P^2 + d)^{\frac{3}{2}}}{P} \times \frac{1}{2} p$

where $p = 3.1416$.

2. Solidity = $.3927 b (D^2 + d^2)$.

These formulæ only obtain when the base of the frustum is perpendicular to the axis of the solid. For an oblique segment, multiply the base by half the altitude for the content.

PARABOLIC SPINDLE.

Let m denote the middle diameter, and l the length of the spindle; then

1. Solidity = $.418879 l m^2$

For the solidity of the middle frustum.

Let d denote the diameter of the end, then the former notation remaining,

1. Solidity = $.05236 l (8 m^2 + 3 d^2 + 4 d m)$.

HYPERBOLOID.

Let a and c represent the semi-axes of the generating hyperbola; v the distance of its base from the centre.

Also let $A = \frac{a^2}{v(a^2 + c^2)}$ be the semi-transverse of

another hyperbola, whose semi-conjugate is c, the same with that of the former.

Then find by the proper formula, the area of the frustum of this latter hyperbola, whose ends are distant from the centre by v and a; multiply this area by 3.1416 for the surface; that is

1. Surface = $p \times \left\{ v Y - a y - A C \cdot \text{hyp. log. of} \right.$

$\left. \frac{A y + c v}{A y + a c} \right\}$, where $p = 3.1416$, Y and y the ordinates of the latter hyperbola:

2. Solidity = $\frac{1}{2} \text{par.}^2 \times \frac{t + \frac{1}{2} a}{t + a}$

where a = altitude, r = radius of the base, t the transverse axis, and $p = 3.1416$.

3. Solidity = $\frac{r^2 + d^2}{6} \times a p$

where d is the diameter, in the middle between the base and vertex.

FRUSTUMS of HYPERBOLOIDS.

Let D and d denote the semi-diameters of the two ends, a the altitude, t and c the transverse and conjugate axes, $p = 3.1416$; then

1. Solidity = $\frac{1}{2} p a \left\{ D^2 + d^2 - \frac{c^2 a^2}{3 t^2} \right\}$

2. Solidity = $\frac{1}{2} p a \left\{ D^2 + 4 d^2 + d \right\}$

where d is the middle diameter.

HYPERBOLIC SPINDLE.

Let A = the generating area, D the greatest diameter, L the length of the spindle, $p = 3.1416$; then

1. Solidity $\frac{1}{2} p \left\{ \frac{(L^2 + D^2)}{D} A - \frac{1}{3} L^3 \right\}$

2. Solidity $\frac{1}{2} p L \left\{ D^2 + \frac{(3A - LD)}{L} 4C \right\}$

where C is the central distances.

To the preceding formulæ it will be proper to annex the following table of the area of circular segments, which will be found very convenient in various problems relating to the circle and ellipse; and with this addition, the foregoing formulæ will be found to contain all that is essentially necessary for measuring any plane or solid, with the exception of some of the higher curves, which could not be conveniently reduced into a similar form. In those cases where logarithms, sines, tangents, &c. are necessary, see LOGARITHMS, SINES, &c.

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TABLE of Circular Segments to Radius $\frac{1}{2}$.

Vertical Side.	Area of Segment.																
001	000012	051	015119	101	041476	151	074580	201	112624	251	154412	301	199085	351	245934	401	294049
002	000119	052	0153561	102	042080	152	075306	202	113426	252	155280	302	200001	352	246889	402	295330
003	000219	053	016007	103	042687	153	076026	203	114240	253	156149	303	200922	353	247845	403	296611
004	000317	054	016457	104	043296	154	076740	204	115065	254	157019	304	201841	354	248801	404	297892
005	000470	055	016911	105	043908	155	077469	205	115882	255	157890	305	202761	355	249787	405	298779
006	000618	056	017369	106	044522	156	078194	206	116650	256	158762	306	203683	356	250715	406	299655
007	000779	057	017831	107	045139	157	078921	207	117460	257	159636	307	204605	357	251678	407	300535
008	000951	058	018296	108	045759	158	079649	208	118271	258	160510	308	205527	358	252631	408	301420
009	001133	059	018766	109	046381	159	080380	209	119081	259	161386	309	206451	359	253590	409	302291
010	001329	060	019239	110	047005	160	081112	210	119897	260	162263	310	207376	360	254550	410	303197
011	001533	061	019716	111	047632	161	081846	211	120712	261	163140	311	208301	361	255510	411	304117
012	001746	062	020196	112	048262	162	082582	212	121529	262	164019	312	209227	362	256471	412	305055
013	001968	063	020680	113	048894	163	083320	213	122347	263	164899	313	210154	363	257431	413	306014
014	002199	064	021168	114	049528	164	084059	214	123167	264	165780	314	211082	364	258395	414	307015
015	002438	065	021659	115	050165	165	084801	215	123988	265	166663	315	212011	365	259357	415	308010
016	002695	066	022154	116	050804	166	085541	216	124810	266	167546	316	212940	366	260328	416	309009
017	002940	067	022652	117	051446	167	086289	217	125634	267	168430	317	213871	367	261284	417	310001
018	003202	068	023154	118	052090	168	087036	218	126459	268	169315	318	214802	368	262248	418	311066
019	003471	069	023659	119	052736	169	087785	219	127285	269	170202	319	215733	369	263213	419	312054
020	003748	070	024168	120	053386	170	088535	220	128112	270	171089	320	216666	370	264178	420	313041
021	004031	071	024680	121	054036	171	089287	221	128941	271	171978	321	217599	371	265144	421	314029
022	004329	072	025193	122	054689	172	090041	222	129773	272	172870	322	218533	372	266111	422	315016
023	004618	073	025714	123	055345	173	090797	223	130605	273	173758	323	219468	373	267078	423	316004
024	004921	074	026236	124	056003	174	091554	224	131438	274	174649	324	220404	374	268048	424	316992
025	005230	075	026761	125	056663	175	092311	225	132272	275	175542	325	221340	375	269013	425	317951
026	005546	076	027289	126	057326	176	093074	226	133105	276	176435	326	222277	376	269982	426	318970
027	005867	077	027821	127	057991	177	093836	227	133945	277	177330	327	223215	377	270951	427	319959
028	006194	078	028356	128	058658	178	094601	228	134784	278	178225	328	224154	378	271920	428	320948
029	006527	079	028894	129	059327	179	095366	229	135624	279	179122	329	225093	379	272890	429	321936
030	006865	080	029435	130	059999	180	096134	230	136465	280	180019	330	226033	380	273861	430	322925
031	007209	081	029979	131	060672	181	096903	231	137307	281	180918	331	226974	381	274832	431	323918
032	007558	082	030526	132	061348	182	097674	232	138150	282	181817	332	227915	382	275803	432	324909
033	007913	083	031076	133	062026	183	098447	233	138995	283	182718	333	228858	383	276775	433	325900
034	008273	084	031629	134	062707	184	099223	234	139841	284	183619	334	229801	384	277748	434	326892
035	008638	085	032186	135	063389	185	099997	235	140688	285	184521	335	230745	385	278721	435	327882
036	009008	086	032745	136	064074	186	100771	236	141537	286	185425	336	231689	386	279694	436	328874
037	009383	087	033307	137	064760	187	101553	237	142387	287	186329	337	232634	387	280668	437	329866
038	009763	088	033872	138	065449	188	102334	238	143238	288	187234	338	233580	388	281642	438	330858
039	010148	089	034441	139	066149	189	103116	239	144091	289	188140	339	234526	389	282617	439	331850
040	010537	090	035011	140	066853	190	103900	240	144944	290	189047	340	235473	390	283592	440	332843
041	010931	091	035585	141	067528	191	104685	241	145799	291	189955	341	236421	391	284568	441	333836
042	011330	092	036162	142	068225	192	105472	242	146655	292	190864	342	237369	392	285544	442	334829
043	011734	093	036741	143	068924	193	106261	243	147512	293	191775	343	238318	393	286521	443	335822
044	012142	094	037322	144	069625	194	107051	244	148371	294	192684	344	239268	394	287498	444	336816
045	012554	095	037909	145	070328	195	107842	245	149230	295	193596	345	240218	395	288476	445	337810
046	012971	096	038505	146	071033	196	108636	246	150091	296	194509	346	241169	396	289453	446	338804
047	013392	097	039087	147	071741	197	109430	247	150953	297	195422	347	242121	397	290431	447	339798
048	013818	098	039680	148	072450	198	110226	248	151816	298	196337	348	243074	398	291411	448	340793
049	014247	099	040276	149	073161	199	111024	249	152660	299	197252	349	244026	399	292390	449	341787
050	014681	000	040875	150	073874	200	111823	250	153546	300	198168	350	244980	400	293396	450	342782

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Let us now, before we conclude this article, give a few examples in order to illustrate the use of the preceding formulae; in doing which we shall only select a few of the most difficult cases, the others being so extremely obvious, that no hesitation or doubt can possibly arise in their application.

Example 1.—The three sides of a triangle are 790, 1000, and 864: required the area.

By formula 4, for triangles, we have

$$\text{Log. area} = \frac{1}{2} \left\{ \begin{array}{l} \log. \frac{1}{2}s + \log. (\frac{1}{2}s - a) + \log. (\frac{1}{2}s - b) \\ + \log. (\frac{1}{2}s - c) \end{array} \right\}$$

Now $790 = a$
 $1000 = b$
 $864 = c$

$2)2654 = s$

$1327 = \frac{1}{2}s$	$\log. 1327 = 3.122871$
$537 = (\frac{1}{2}s - a)$	$\log. 537 = 2.729974$
$327 = (\frac{1}{2}s - b)$	$\log. 327 = 2.514548$
$463 = (\frac{1}{2}s - c)$	$\log. 463 = 2.665581$

$2)11.032974$

The area = $328474 = 5.516487$

Example 2.—The two diagonals of a trapezium are 30 and 40, and their angle of intersection 48° : required the area.

By formula 2, the area = $\frac{1}{2} d d' \sin. M'$.

$\frac{1}{2} d d' = \frac{1}{2} (30 \times 40) = \frac{1200}{2}$
 $\sin. 48^\circ = .743145$

The area = 445.887000

Example 3.—Required the length of a circular arc, whose chord is 6, and radius 9.

By formula 2, for circular arcs.

The area = $2 d \sqrt{q} + \frac{q}{2.3} A + \frac{3^2 q}{4.5} B + \frac{5^2 q}{6.7} C, \&c.$

where $q = \frac{v}{d}$; v being the versed sine, and d the diameter.

By the property of the circle we readily find the versed sine, $v = 9 - 6 \sqrt{2} = .51471862$, and $.51471862 \div 18 = .02859548$.

Whence $A = 2 d \sqrt{q} = 6.087672$

$B = \frac{q}{2.3} A = 29013$

$C = \frac{3^2 q}{4.5} B = 373$

$D = \frac{5^2 q}{6.7} C = 6$

$6.117064 = \text{arc as required.}$

Or, by using formula 3, we have

$\text{arc} = 2s + \frac{q}{2.3} A + \frac{3^2 q}{4.5} B + \frac{5^2 q}{6.7} C + \frac{7^2 q}{8.9} D, \&c.$

where s is the sine of the half arc = 3, and $q = \frac{s^2}{r^2} = \frac{9}{81} = \frac{1}{9}$
 $= \frac{1}{9} = 0.111111, \&c.$

Whence $A = 2s = 6.00000$

$B = \frac{q}{2.3} A = 0.111111$

$C = \frac{3^2 q}{4.5} B = 0.055555$

$D = \frac{5^2 q}{6.7} C = 0.00367$

$E = \frac{7^2 q}{8.9} D = 0.00028$

$F = \frac{9^2 q}{10.11} = 0.00002$

The required arc = 6.11063

Example 4.—Required the area of that circular segment, of which the diameter is 52, and the height or versed sine 2.

By formula 2, for circular segments.

Area = $2 \sqrt{d v} \times \left\{ \frac{2}{3} - \frac{3v}{5.2d} A - \frac{5v}{7.4d} B - \frac{7.3v}{9.6d} C \&c. \right\}$; where v is the versed sine = 2, and the diameter = 52.

$+ A = \frac{4v \sqrt{d v}}{3} = \frac{2}{3} \sqrt{104} = 27.1947707$

$- B = \frac{3v}{5.2d} A = \frac{3}{10.26} A = 0.3137858$

$- C = \frac{5v}{7.4d} B = \frac{5}{7.4 \cdot 29} B = 0.0021551$

$- D = \frac{7.3v}{9.6d} C = \frac{7}{3.6 \cdot 26} C = 0.0000322$

$- E = \frac{9.5v}{11.8d} D = \frac{9.5}{11.8 \cdot 26} D = 0.0000007$

Negative terms = -0.3159738
 Area of segment = 26.8787969

But the readiest method of finding the area of circular segment is by formula 9; where the area = $d^2 \times$ by tabular number corresponding to $\frac{v}{d}$.

In the present examples $\frac{v}{d} = \frac{2}{52} = \frac{1}{26} = .038 \frac{6}{13}$, the corresponding tabular number by preceding table = $.009940$ and $.009940 \times 52^2 = 26.878$, the area required.

This method, however, can only be practised in cases where great accuracy is not required, unless the table of segments be very extensive, such as that given by Hutton in his Mensuration.

Note.—In those cases where the quotient is not found exactly in the column of heights, or versed sines, as in the example above, a proportional part must be found for the fractional part of the number; viz. as 1 is to the difference between the two areas corresponding to the two versed sines, between

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between which the given number lies; so is the fractional part of that number to a fourth proportional, which shall be added to the least area, or subtracted from the greater.

Example 5.—Required the periphery of an ellipse, the diameters of which are 24 and 18.

By formula 1, for the ellipse.

$$\text{Periphery} = C \times \left\{ 1 + \frac{m}{2^2} - \frac{3m^2}{2^2 \cdot 4^2} + \frac{3 \cdot 5m^3}{2^2 \cdot 4^2 \cdot 6^2} - \right.$$

1st term	1	=		+ 1.00000
2d term A =	$\frac{m}{2^2}$	=	$\frac{m}{4}$	= - .10938
3d term B =	$\frac{3m^2}{2^2 \cdot 4^2}$	=	$\frac{3m}{4^2}$	A = - .00897
4th term C =	$\frac{3 \cdot 5m^3}{2^2 \cdot 4^2 \cdot 6^2}$	=	$\frac{3 \cdot 5m}{6^2}$	B = - .00164
5th term D =	$\frac{3^2 \cdot 5^2 \cdot 7m^4}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2}$	=	$\frac{5 \cdot 7m}{8^2}$	C = - .00039
6th term E =	$\frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9m^5}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2}$	=	$\frac{7 \cdot 9m}{10^2}$	D = - .00011
7th term F =	$\frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9^2 \cdot 11m^6}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2 \cdot 12^2}$	=	$\frac{9 \cdot 11m}{12^2}$	E = - .00003
8th term G =	$\frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9^2 \cdot 11^2 \cdot 13m^7}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2 \cdot 12^2 \cdot 14^2}$	=	$\frac{11 \cdot 13m}{14^2}$	F = - .00001

Negative terms	= .12053
First term	= 1.00000
	.87947

whence .87947 × 24 × 3.1416 = 66.31056, the length of the curve required.

Example 6.—Required the length of the curve of a parabola, cut off by a double ordinate to the arc, whose length is as 12, the absciss being 2.

By formula 1, for parabolic arcs.

$$\text{Parabolic arc} = \frac{1}{2} p \left\{ q s + \text{hyp. log. } (q + s) \right\}$$

where p is the parameter = $\frac{y^2}{x} = \frac{b^2}{2} = 18$, $q = \frac{2y}{p} = \frac{1}{3}$, and $s = \sqrt{(1 + q^2)} = \sqrt{(1 + \frac{1}{9})} = 1.018504$, whence the required arc =

By formula 1, for hyperbolic arcs.

$$\text{Arc} = c \times \left\{ A + \frac{q}{2} B - \frac{q^2}{2 \cdot 4} C + \frac{3q^3}{2 \cdot 4 \cdot 6} D - \frac{3 \cdot 5q^4}{2 \cdot 4 \cdot 6 \cdot 8} E +, \&c. \right\}$$

$$\text{where } \frac{c^2 + y^2}{c^2} = q = \frac{80^2 + 60^2}{60^2} = 1\frac{1}{2}$$

$$A = \text{hyp. log. } \frac{y + \sqrt{(c^2 + y^2)}}{c} = 3274501$$

$$B = \frac{1}{2} \left\{ y \sqrt{(c^2 + y^2)} - c^2 A \right\} = 10.76133$$

$$C = \frac{1}{4} \left\{ y^3 \sqrt{(c^2 + y^2)} - 3c^2 B \right\} = 641.796405$$

$$D = \frac{1}{8} \left\{ y^5 \sqrt{(c^2 + y^2)} - 5c^2 C \right\} = 45698.7933$$

E =

$$9 \times \left\{ \frac{1}{2} \times 1.2018504 + \text{hyp. log. } 1.8675170 \right\}$$

$$\text{Now hyp. log. } 1.867517 = .6251449$$

$$\frac{1}{2} \times 1.2018504 = .6012336$$

$$\hline 1.4263785$$

$$\text{Multiplier } \hline 9$$

$$\text{Parabolic arc } \hline - 12.8374065$$

Example 7.—Required the length of an hyperbolic arc, beginning at the vertex, the transverse diameter being 80, conjugate 60, and ordinate 10.

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$$E = \frac{1}{3} \left\{ y^2 \sqrt{e^2 + y^2} - 7 e^2 D \right\} = 3540529 \cdot 3125$$

Hence +	A = .327450	-	$\frac{q^2}{2 \cdot 4}$	C = .000764
	+ $\frac{q}{2}$ B = .016607	-	$\frac{3 \cdot 5 q^3}{2 \cdot 4 \cdot 6 \cdot 8}$	E = .000012
	+ $\frac{3 q^2}{2 \cdot 4 \cdot 6}$ D = .000084		&c.	= &c.
	Sum + .344141			Sum - .000776

therefore difference $.343365 \times 30 = 10.30095$, the arc required.

Example 8.—Required the solidity of a conic frustum of which the altitude is 16, and two diameters 20 and 30.

By formula 4, for conic frustums.

$$\text{Solidity} = \frac{1}{3} p \left\{ D^2 + D d + d^2 \right\} \times .7854$$

where $D = 30$, $d = 20$, and $h = 16$.

Now $30^2 + 30 \cdot 20 + 20^2 = 1900$

therefore $\frac{16}{3} \times 1900 \times .7854 = 7625.38$, the solidity required.

Example 9.—Required the surface and solidity of the five regular bodies, the linear side of each being 2.

By the formula for the regular bodies.

Tetraedron	{	Surface = $1.73205 \times 4 = 6.92820$	
	{	Solidity = $0.11785 \times 8 = .94280$	
Hexaedron	{	Surface = $6.00000 \times 4 = 24.00000$	
	{	Solidity = $1.00000 \times 8 = 8.00000$	
Octaedron	{	Surface = $3.46410 \times 4 = 14.65640$	
	{	Solidity = $0.47140 \times 8 = 3.77120$	
Dodecaedron	{	Surface = $20.64578 \times 4 = 82.58312$	
	{	Solidity = $7.66312 \times 8 = 61.30496$	
Icofaedron	{	Surface = $8.66025 \times 4 = 34.64100$	
	{	Solidity = $2.18169 \times 8 = 17.45352$	

These examples will be sufficient for illustrating the use of the preceding formulæ, and for rendering their application to any other problems perfectly simple and obvious. Neither the limits of this article, nor the nature of the work, would allow of our entering upon their investigation; the reader, therefore, who is desirous of information on this head, is referred to the works of Dr. Hutton and Mr. Bonnycastle, above-mentioned.

MENSURATION of Altitudes, Distances, &c. See ALTITUDE and DISTANCE.

MENSURATION of Land. See SURVEYING.

MENSURATION of Timber, or Timber Measure, is the method employed by artificers in measuring trees, joists, beams, &c.: and as these always fall under one or other of the regular solids which have been already treated of in the preceding article, it would seem unnecessary to repeat here any rules for the mensuration of timber: but the fact is, that an erroneous rule has been adopted by persons concerned in this line of business, which common practice has so established, that it is rather to be wished than expected it should be replaced by some other, either perfectly true, or approaching towards the truth; for, according to the present rule, a tree frequently contains $\frac{1}{4}$ th more or less timber than it is estimated at, which, at the modern price of that article, is a matter of some importance, and merits the attention of

the timber grower, as well as the merchant. Government has, in some instances, come forward to fix a standard of measure, as in corn, coals, land, &c.; and as old prejudices can never be so successfully combated, as by the authority of enlightened legislators, it is to be hoped that we may some day find this, and other topics of a similar nature, become the subject of parliamentary investigation. We will, in the following pages, shew the great inaccuracy attending the present method, but, in the first place, it will be proper to state the rule as it is at present employed by all persons concerned in the buying or selling of timber.

GENERAL RULE.

Multiply the square of the mean quarter girt, or quarter circumference, by the length of the tree, for the contents; which, when the dimensions are taken in feet, will be also feet; and this divided by 50, the number of feet in a load, will give the number of loads.

Note—1. If the piece of timber is of the same girt throughout, the girt any where taken is the mean girt.

2. If the tree tapers regularly from one end to the other, the girt taken in the middle is accounted the mean girt; or take half the sum of the girts at the two ends for the same.

3. But if the tree do not taper regularly, but is unequal, being thick in some places and small in others; it is customary to take several different dimensions, the sum of which, divided by the number of them, is accounted the mean girt. But when the tree is very irregular, it is best to divide it into several lengths, and to find the content of each separately.

4. That part of a tree, or of the branches, whose quarter girt is less than half a foot, is not accounted timber.

5. It is usual to make a certain allowance in girting a tree for the thickness of the bark, which is generally one inch to every foot in the girt. This practice, however, is unreasonable, and ought to be discouraged. Elm timber is the only kind in which any allowance is necessary, and even in this, one inch out of the whole girt is quite sufficient.

As an example in the preceding rule: let it be required to find the content of a tree, the length of which is 9 feet 6 inches; and quarter girt 3 feet 6 inches.

By Decimals.	By Duodecimals.
3.5	3-6
3.5	3-6
175	10-6
105	1-9
Carry forward 12.25	12-3

Brought

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By Decimals.	By Duodecimals.
Brought forward 12.25	12—3
95	9—6
6125	110—3
11025	6—11
Feet 110.375	Content = Feet 116—41

Such is the rule commonly used by persons concerned in buying and selling of timber, on which we intend to make a few remarks, in order to point out its inaccuracy, which is not so generally known as it ought to be. Suppose, for instance, we take a balk 24 feet long, and a foot square throughout, and, consequently, its solidity 24 feet. Now if this piece of timber be slit exactly in two, from end to end, making each piece 6 inches, or $\frac{1}{2}$ a foot broad, and 12 inches, or a foot thick, it is evident that the true solidity of each piece will be 12 feet. But by the quarter girt method they would amount to much more: for the false quarter girt being equal to half the sum of the breadth and thickness, in this case will be 9 inches, or $\frac{3}{4}$ of a foot; the square of which is $\frac{9}{16}$, and therefore $\frac{9}{16} \times 24 = 13\frac{1}{2}$ feet for the solidity of each part, making the two pieces together 27 feet, instead of 24, which is the true content.

Again, suppose this balk to be so cut, that the breadth of the one piece may be only 4 inches, or $\frac{1}{3}$ of a foot; and that of the other 8 inches, or $\frac{2}{3}$ of a foot. Here the true content of the less piece will be 8 feet, and that of the greater 16 feet. But proceeding by the other method, we have the quarter girt of the less piece $\frac{2}{3}$ of a foot, and of the other piece $\frac{4}{3}$ of a foot. Whence the content of the less piece will be found $= \frac{4}{9} \times 24 = 10\frac{2}{3}$ feet, instead of 8 feet; and the content of the greater piece will be $16\frac{2}{3}$ feet, instead of 16; making the sum of the two $27\frac{1}{3}$ feet, instead of 24 feet. Farther, if the less piece be cut only two inches broad, and consequently the greater 10 inches, the true content of the less piece would be 4 feet, and that of the greater 20 feet. Whereas by the other method, the quarter girt of the less piece would be 7 inches, or $\frac{7}{12}$ of a foot; and $\frac{49}{144} \times 24 = 8\frac{1}{3}$ feet, instead of 4 feet, for the content; and by the same method, the content of the greater piece would be $20\frac{1}{3}$ feet, instead of 20, and their sum $28\frac{1}{3}$ feet, instead of 24.

Hence it is obvious, that the greater the proportion is between the breadth and the depth, the greater will be the error, by using the false method; and the sum of the two parts, by the same method, is greater, as the difference of the same two parts is greater; and, consequently, the sum is least when the two parts are equal to each other; or when the balk is cut equally in two; and finally, when the sides of a piece of timber differ not above an inch or two from each other, the quarter girt may be used without any very sensible error. To avoid, therefore, this inconsistency in the result, the following method should be employed, *viz.* Multiply the length, breadth, and depth continually together, and the product will be the true content in all cases of this kind.

With regard to round timber the error is of a different kind. We have seen in the preceding article, that the area of a circle is found by squaring the circumference, and multiplying that square by .07958, and, therefore, if a quarter of the circumference is used, we must multiply its square by $.07958 \times 16 = 1.27328$.

Hence, to find the true content of a piece of cylindrical timber, we ought to multiply the square of the quarter girt by the constant number 1.27328, and that product by

the length, instead of which the constant multiplier is omitted, and consequently the solidity is returned about 25 parts less than it is. But as the utmost accuracy is not necessary in those cases, the following rule might be used, which is as simple as can be desired, *viz.* Multiply the square of $\frac{1}{4}$ of the mean girt by double the length for the content, which is not far from the truth.

Another error to which timber measure is always subject, is the way in which the mean girt is assumed in tapering trees, which, as we have before stated, is done either by taking the girt in the middle, or half the sum of the extreme girts, both of which are equally false, so obviously so, that a tree of certain dimensions will measure more after a part of it has been cut off, than it did before. This being the case, it will not be amiss to shew the extreme inaccuracy of the method, and the folly in persisting in it, by the solution of the following problems, which have been taken from Dr. Hutton's Mensuration.

PROBLEM I.

To find where a tapering timber must be cut, so that the two parts, measured separately, shall measure the most possible, and be greater than if it were cut in any other two parts, and greater than the whole.

Put G = the greatest girt, g = the least girt, x = the girt at the section, z = the length of the part to be cut off, and L the whole length of the timber. Then by similar figures $L : z :: G - g : x - g$; hence $x = \frac{Gz - gz}{L} + g$; but $(g + x)^2 z + (G + x)^2 (L - z)$ is to be a *maximum*; which being put into fluxions, and reduced, gives $z = \frac{1}{2} L$.

Therefore, a tree being cut exactly in the middle, the two parts will measure more than if it were cut in any other two parts, and more than the whole tree. If a tree, of which the greater girt is 12 feet, and less girt 2 feet, and length 32 feet, be thus cut in two parts, the measure of the two parts will exceed the measure of the whole tree by 18 feet.

PROBLEM II.

To find where a tree must be cut, so that the part next the greater end may measure the greatest possible.

Here, by using the same notation as in the last problem, we have also $x = \frac{Gz - gz}{L} + g$, and $(G + x)^2 (L - x)$ a *maximum*; which, put into fluxions as before, gives $z = \frac{G - 3g}{G - g} + \frac{1}{2} L$.

Therefore, from the greater girt subtract the less girt, and that difference divided by the difference of the girts, and multiplied by $\frac{1}{2}$ of the whole length, will be the length to be cut off.

PROBLEM III.

To find where a tree must be cut, so that the part next the greater end may measure the same as the whole tree before it was cut.

Using still the same notation, and writing besides s for the sum of the two girts, and d for their difference; we shall have $s^2 L = (L - z)(G + x)^2$, or substituting, instead of x , its value $\frac{Gz - gz}{L} + g$, or $\frac{dz}{L} + g$, we obtain

$$z = \frac{L}{2d} + \left\{ \sqrt{(4s^2 + d) - 2s + d} \right\}$$

which

which length being cut off, the remaining part will measure the same as the whole tree.

These results, which are the necessary consequence of the preceding rules, are so obviously erroneous and inconsistent, that they speak for themselves, and therefore require no farther comment.

MENTAL, something that relates, or is restrained, to the operation of the understanding.

Thus, a mental prayer is such a one as is made merely in the mind, without pronouncing one word of it.

Mental reservations are the refuge of hypocrites. See RESERVATION.

MENTAL Derangement. Under this head may be comprehended a variety of terms, which have been employed to designate certain affections of the mind, or, as they have been called, disorders of the intellect. In the preliminary part of this investigation, it is highly important to understand fully the force and meaning of the words, which are intended to establish these different significations; and also to discover the contrivances of language, which have served to characterize the phenomena of disordered understanding. That the mind has no language peculiar to itself, seems to be an admitted axiom; because all the terms which are applied to it have their origin in the physical circumstances which surround us. The mental operations, which are supposed to be extensive, have not furnished any terms, (as the result of such internal operations,) which we did not previously possess, and which we have been compelled to borrow from the objects and impressions of the material world.

Although authors have generally divided mental derangement into *mania* and *melancholia*, according to the system of the Greeks; yet most nations have adopted peculiar expressions, to signify the form or degree of derangement of intellect. The term *derangement*, which we have taken immediately from the French, and which means out of *rank*, or *order*, is metaphorically applied to the mind, to denote that its ideas are out of the rank, or order, generally preserved by intelligent beings. *Delirium*, employed by the Romans, had its origin from the process of ploughing: for when the oxen deviated from the line to be pursued, they were said to be *de lira*, out of the track; and this figure was transferred to the deviations of the human intellect, when it erred from the established course. *Insane*, *insanus*, means merely *unfound*. The Greek *μανία* was probably from their verb *μαίνομαι*, *I rage*; *μελανχολία*, from *μελας*, *black*, and *χολή*, *bile*; black bile being supposed the cause of this disease. In the opinion of Cicero, (*Disputat. Tusculan.* lib. iii. c. 5.) the Roman terms, which marked the disorders of the intellect, were more appropriate than those employed by the Greeks. "Multoque melius hæc notata sunt verbis Latinis, quam Græcis: quod aliis quoque multis locis reperietur. Sed id alias: nunc, quod instat. Totum igitur id quod quaerimus, quid et quale sit, verbi vis ipsa declarat. Eos enim sanos quoniam intelligi necesse est, quorum mens motu, quasi morbo, perturbata nullo sit; qui contra affecti sunt, hos insanos appellari necesse est. Itaque nihil melius, quam quod est in consuetudine sermonis Latini; cum *exisse ex potestate* dicimus eos, qui effrenati feruntur aut libidine aut iracundia: quamquam ipsa iracundia libidinis est pars: sic enim definitur, *iracundia ulciscendi libido*. Qui igitur *exisse ex potestate* dicuntur; idcirco dicuntur, quia non sunt in potestate mentis: cui regnum totius animi a natura tributum est. Græci autem *μανίαν* unde appellant, non facile dixerim. Eam tamen ipsam distinguimus nos melius, quam illi; hanc enim insaniam, quæ juncta stultitiæ patet latius, a furore disjungimus: Græci volunt illi quidem, sed parum valent verbo: quem nos furem, *μελανχολίαν* illi vocant.

Quasi vero atra bili solum mens, ac non sæpe vel iracundia graviore, vel timore, vel dolore moveatur! quo genere Athamantem, Alemæonem, Ajacem, Orestem furere dicimus. Qui ita sit affectus, cum dominum esse rerum suarum vetat duodecim tabulæ." The supposed regulation of the intellect, in certain states, by the influence of the moon, has produced the term *lunatic*; which word still prevails in all legal proceedings relative to the insane. The vulgar opinion, that in madness the mind was broken into fragments, has given rise to the terms *crazy* (*ecrasé*, Fr.), *cracked*, and *shatter-brained*. The word *mad* has been derived by Mr. Haslam ("Observations on Madness and Melancholy") from the Gothic *mod*, which signifies *rage*. He observes, "It is true, we have now converted the *o* into *a*, and write the word *mad*; but *mod* was anciently employed." Of the similarity between violent anger and madness, the observation has been general. Cicero says, "An est quicquam similis insanix quam ira? quam bene Ennius initium dixit insanix." (*Disp. Tusc.*) Dr. Beddoes (*Hygeia*, N^o 12.) observes, that "*mad* is one of those words which means almost every thing and nothing. At first, it was, *I imagine*, applied to the transports of rage; and when men were civilized enough to be capable of insanity, their insanity, I presume, must have been of the frantic sort; because, in the untutored, intense feelings seem regularly to carry a boisterous expression."

Authors, who have treated on the subject of mental derangement, have commonly been desirous of affording a definition: they have endeavoured to compress into a few words, or a short sentence, the prominent and discriminating phenomena of insanity, and thus to establish an essential character of the disorder. However meritorious their labours, their success has been by no means proportionate to their exertions. They have all fundamentally differed; and to enumerate their attempts is only to record their failures. Dr. Mead conjectures, "that this disease consists entirely in the strength of imagination." "Insanity," says Dr. Cullen, "consists in such false conceptions of the relations of things as lead to irrational emotions or actions. Melancholy is partial insanity, without indigestion; mania is universal insanity." Dr. Ferriar, adopting the generally accepted division of insanity into mania and melancholia, conceives, in mania, *false perception*, and consequently confusion of ideas, to be a leading circumstance. Melancholia he supposes to consist in *intensity of idea*, which is a contrary state to false perception. Dr. Arnold observes, that "insanity, as well as delirium, may be considered as divisible into two kinds; one of which may be called *ideal*, and the other *notional* insanity.

"*Ideal* insanity is that state of mind, in which a person imagines he sees, hears, or otherwise perceives, or converses with, persons or things, which either have no external existence to his senses at the time; or have no such external existence, as they are then conceived to have; or if he perceives external objects as they really exist, has yet erroneous and absurd ideas of his own form, and other sensible qualities:—such a state of mind continuing for a considerable time, and being unaccompanied with any violent or adequate degree of fever.

"*Notional* insanity is that state of mind, in which a person sees, hears, or otherwise perceives external objects, as they really exist, as objects of sense; yet conceives such notions of the powers, properties, designs, state, destination, importance, manner of existence, or the like, of things and persons, of himself and others, as appear obviously, and often grossly erroneous, or unreasonable to the common sense of the sober and judicious part of mankind. It is of considerable

considerable duration; it never accompanied with any great degree of fever, and very often with no fever at all."

Mr. Hallam, in the first edition of his work (*Observations on Insanity*), defined insanity to be "an incorrect association of familiar ideas, which is independent of the prejudices of education, and is always accompanied with implicit belief, and generally with either violent or depressing passions." But the same author, in his second edition, has omitted this definition, and seems to be convinced that, instead of endeavouring to discover an infallible definition of madness, which he believes will be found impossible, (as it is an attempt to comprise in a few words the wide range and untable character of this Proteus-disorder,) much greater advantage would be obtained, if the circumstances could be precisely defined, under which it is justifiable to deprive a human being of his liberty.

Symptoms.—The approaches of insanity have been variously related by different writers. The late Dr. John Monro, in a pointed and elegant reply to Dr. Battie's *Treatise on Madness*, has remarked, that "high spirits, as they are generally termed, are the first symptoms of this kind of disorder: these excite a man to take a larger quantity of wine than usual; (for those who have fallen under my observation, in this particular, have been naturally very sober;) and the person thus affected, from being abtemperious, reserved, and modest, shall become quite the contrary; drink freely, talk boldly, obscenely, swear, sit up till midnight, sleep little, rise suddenly from bed, go out a hunting, return again immediately, set all his servants to work, and employ five times the number that is necessary: in short, every thing he says or does betrays the most violent agitation of mind, which it is not in his power to correct; and yet, in the midst of all this hurry, he will not misplace one word, or give the least reason for any one to think he imagines things to exist that really do not, or that they appear to him different from what they do to other people. They who see him but seldom, admire his vivacity, are pleased with his sallies of wit, and the sagacity of his remarks: nay, his own family are with difficulty persuaded to take proper care of him, until it becomes absolutely necessary, from the apparent ruin of his health and fortune."

In many instances, pain of the head and throbbing of its arteries precede an attack of insanity: sometimes giddiness and confused vision are complained of, as precursory symptoms. Those who have been several times disordered are now and then sensible of the return of their malady. Some have described the attack as highly delightful; and of this pleasurable feeling, a curious instance is recorded in the *Bibliothèque Britannique*, by a recovered lunatic, who had been a patient of the late Dr. Willis. "I always expected with impatience the accession of the paroxysms, since I enjoyed, during their presence, a high degree of pleasure. They lasted ten or twelve hours. Every thing appeared easy to me. No obstacles presented themselves either in theory or practice. My memory acquired, all of a sudden, a singular degree of perfection: long passages of Latin authors occurred to my mind. In general, I have great difficulty in finding rhythmical terminations; but then I could write in verse with as much facility as in prose. I was cunning, malicious, and fertile in all kinds of expedients." Some have described a sense of working in the head, and also in the intestines, as if they were in a state of fermentation. Others observe that they do not seem to possess their natural feelings; and they all agree that they become confused, from the sudden and rapid intrusion of unconnected thoughts.

Mr. Hallam, whose situation in Bethlem Hospital affords

abundant opportunities of observing this disorder, has thus related the commencement of madness and melancholy. "On the approach of mania, they first become uneasy, are incapable of confining their attention, and neglect any employment to which they have been accustomed. They get but little sleep; they are loquacious, and disposed to harangue, and decide promptly and positively upon every subject that may be started. Soon after, they are divested of all restraint, in the declaration of their opinions of those with whom they are acquainted. Their friendships are expressed with fervency and extravagance; their enmities with intolerance and disgust. They now become impatient of contradiction, and learn reproof. For supposed injuries, they are inclined to quarrel and fight with those about them. They have all the appearance of persons inebriated; and those, who are unacquainted with the symptoms of approaching mania, generally suppose them to be in a state of intoxication. At length suspicion creeps upon the mind, they are aware of plots which had never been contrived, and detect motives that were never entertained. At last, the succession of ideas is too rapid to be examined; the mind becomes crowded with thoughts, and confusion ensues. Those under the influence of the depressing passions will exhibit a different train of symptoms. The countenance wears an anxious and gloomy aspect; and they are little disposed to speak. They retire from the company of those with whom they formerly associated; seclude themselves in obscure places, or lie in bed the greater part of their time. Frequently, they will keep their eyes fixed to some object for hours together, or continue them an equal time 'bent on vacancy.' They next become fearful, and conceive a thousand fancies: often recur to some immoral act which they have committed, or imagine themselves guilty of crimes which they never perpetrated; believe that God has abandoned them, and with trembling await his punishment. Frequently they become desperate, and endeavour by their own hands to terminate an existence, which appears to be an afflicting and hateful incumbrance."

The mental characteristics of this disorder involve all those aberrations from intellectual soundness, and moral rectitude, which render man a worthless, and frequently a dangerous associate to the community. A degree of cunning, inscrutable by ordinary persons, and not always to be penetrated by those who have acquired extensive experience of the insane, constitutes a leading feature in mental derangement. Whenever they have meditated their own destruction, or intended mischief to others, the accomplishment of the deed has often been the only notice of the intention; and the pride, which usually accompanies this malady, has frequently induced these unhappy sufferers to haunt the persons of those distinguished by rank and elevated in office.

The bodily marks which distinguish the insane, are, a peculiar cast of countenance, familiar to, and recognizable by those versed in this disease; a quick, oftentimes protruded and glistening eye; coldness of the hands and feet; and a capability of sustaining cold with impunity. But Dr. Pinel, physician to the *Bicêtre* at Paris, conceives this exception from the effects of severe cold to be by no means general, and instances the frequent occurrence of mortified extremities during winter; and others of much experience are of the same opinion. Obstinate constipation has been mentioned as an unvarying attendant on madness; but the best informed writers regard it merely as an occasional symptom, prevailing only when general insensibility is the consequence of pressure on the brain. In deranged persons, the ear is the organ of sense most affected;

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fects; *tinnitus aurium* and deafness being found very generally to prevail: whereas blindness, or deprivations of the smell and taste, have been seldom noticed. Mr. Haslam has exclusively observed, in some cases, a relaxation of the scalp; by which it may be wrinkled, or rather gathered up by the hand to a considerable degree: it more generally occurs on the posterior part; is not noticed in the early stages of the disease, but after a raving paroxysm of more continuance.

Appearances on Dissection.—From the testimonies of Chiarugi in Italy, Greding in Germany, and from Mr. Haslam's work, diseased appearances of the brain and its membranes have been detected in those who have died insane. But there may exist many alterations in the structure of these parts, too minute for the eye to observe, and which can never be brought in view by the scalpel. Although Dr. Pinel denies the disorganization of the brain in madness as peculiar to that disease; yet he admits, that the same appearances are found, as occur in those who have died from epilepsy, apoplexy, fever, and convulsions. These morbid appearances consist in excessive determination of blood to the brain, with enlargement of its vessels, and effusion of fluids into its cavities. In many instances the substance of the brain has possessed an increased degree of firmness, and, according to the late Mr. John Hunter, has been found so tough, as to have some elasticity. Dr. Baillie has also remarked, that "when these changes take place in the brain, the mind is at the same time deranged; there is either mania or lethargy; or the person is much subject to convulsive paroxysms." In other cases the brain was of a preternaturally soft consistence. Gangrene of the brain has sometimes occurred, but more frequently in the warmer climates, as may be seen by consulting Chiarugi. The membranes of the brain have been found variously altered from their healthy state: the tunica arachnoidea has become thickened, and rendered more or less opaque. The pia mater is often inflamed, and turgid with blood, and not unfrequently an extravasated blotch appears on some part of this tunic. Effusion of a watery fluid between the membranes of the brain is a very common occurrence, and likewise into its ventricles, which have been consequently enlarged to a surprising extent. Ossifications have been detected, but principally on the dura mater.

Causes.—In the investigation of the causes of mental derangement, there is obviously much uncertainty; our knowledge of the human mind is too limited to affirm that particular states of the intellect will be the necessary result of certain circumstances preceding. Those who have attentively considered this subject have divided the causes of insanity into *physical* and *moral*. Under the head of *physical* causes, hereditary disposition has been stated very generally to prevail; whereby the offspring of an insane parent, or parents, will most probably become similarly affected; but, whether this transmission depend more especially on the male, or female, has not yet been certainly determined. Injuries to the head from external violence; frequent intoxication, particularly when produced by fermented liquors which have undergone the process of distillation; fever, during the course of which delirium has particularly prevailed; mercurial medicines, largely exhibited, and continued for a considerable time, without due precautions; paralytic affections (but these are very frequently the consequence as well as the cause of mental derangement); the suppression of periodical or occasional discharges and secretions; and, in some instances, the retropulsion of cutaneous eruptions; are the ordinary physical causes to which insanity has been ascribed.

The *moral* causes include those emotions which are con-

ceived to originate from the mind itself, and which, from their excess, tend to distort the natural feelings, or, from their repeated accessions, and unrestrained indulgence, at length overthrow the barriers of reason and established opinion. Such are the gusts of violent anger, and the protracted indulgence of grief; the terror impressed by erroneous views of religion; the degradation of pride; disappointment in love; and sudden fright.

Although mental derangement has been observed in persons of all habits and complexions, yet there is doubtless a temperament which particularly disposes to insanity: and there are also certain modes of education, and employment of the faculties, which conduce to their derangement. According to Mr. Haslam's statement, out of 265 patients in Bethlem Hospital, 205 were found to be of a swarthy complexion, with dark or black hair; the remaining 60 were of a fair skin; with light, brown, or red hair. Dr. Pinel, on examining the registers of the Bicêtre, says, that he found inscribed a great many monks and priests, as also a considerable number of country people, who had been driven beside themselves by horrid pictures of futurity; several artists, as sculptors, painters, and musicians; some versifiers, in extacies with their own productions; a pretty considerable number of advocates and attorneys; but there does not appear the name of a single person accustomed to the habitual exercise of his intellectual faculties; not one naturalist, or natural philosopher of ability; no chemist nor geometrician.

The *prognosis*, or means of ascertaining the probable event of mental derangement, is founded on the experience of those practitioners who have particularly attended to the treatment of this disorder. It is, however, to be lamented, that very few of those persons, who have been best qualified to afford information, have transmitted to the world the result of their practice. Much valuable knowledge may therefore be presumed to have perished. In the year 1758 Dr. Battie, the physician to St. Luke's Hospital, justly observed in his "Treatise on Madness," that "among the many good reasons, offered to the public for establishing another hospital for the reception of lunatics, one, and that not the least considerable, was the introducing more gentlemen of the faculty to the study and practice of one of the most important branches of physic." In England, females are more subject to insanity than men; but abroad, the case is believed to be reversed. From 1748 to 1794, a period of 46 years, there were admitted into Bethlem Hospital 4832 women, and 4042 men. Dr. Chiarugi of Florence, who, during four years, saw in the hospitals of St. Dorothea and St. Bonifacio 1157 lunatics, states the proportion of deranged males, as exceeding that of females by one-fifth. Females recover from mental derangement in a greater proportion than men: of the above mentioned 4832 women, 1402 were discharged cured; of the 4042 men, 1155 recovered.

As insanity frequently supervenes on parturition, women, becoming deranged from such cause, recover in a very large proportion. During ten years, 80 patients of this description were admitted into Bethlem Hospital, 50 of whom perfectly recovered. When females become worse at the period of menstruation, or have their catamena in profuse or deficient quantities, such occurrences may be considered unfavourable.

The chance of recovery is greater when the patient is attacked with mania, than when affected with melancholia. When the maniacal and melancholic states alternate, the hope of recovery is diminished. A greater number of patients are observed to recover, when the mental derangement

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ment has been produced from remote *physical* causes, than when it has arisen from causes of a *moral* nature.

It appears from the united testimonies of Dr. Pinel and Mr. Hallam, that a greater number of insane patients have been admitted into the Bicêtre, and Bethlem Hospital, from the age of 30 to 40, than during any other equal period of life; and from the statement of the latter, it may be inferred, that the disease is less frequently cured when it attacks persons of an advanced age. The following statement comprises the number of patients admitted into Bethlem Hospital from 1784 to 1794. The first column marks the age; the second the number admitted; the third poses the number cured; the fourth those who were discharged not cured.

Age between.	Number admitted.	Number discharged cured.	Number discharged uncured.
10 and 20	113	78	35
20 — 30	488	200	288
30 — 40	537	180	347
40 — 50	362	87	275
50 — 60	143	25	118
60 — 70	31	4	27

It is also calculated, that the chance of cure is diminished, in proportion to the length of time which the disorder has continued.

Where mental derangement is complicated with palsy or epilepsy, or where the natural powers of the mind become enfeebled during its continuance, there is but little hope of the patient's recovery. The insanity, which is often excited by the impression of religious terror,—by those gloomy views of futurity, and that constant dread of divine vengeance which false notions on this subject usually inspire,—has seldom a favourable termination. When the derangement has acquired a systematic character, it becomes very difficult to remove: in this state, incidents the most unconnected are easily reconciled, and become fondly involved with the prevailing delusion.

The *Cure* of mental derangement may properly be divided into *management* and *medicine*: for it appears to be the opinion of those who have most successfully treated this disorder, that the proper controul and subjection of the patient to salutary and established rules are of equal importance with the prescription of remedies.

By the common consent of foreigners, the English are supposed particularly to excel in the moral management of this disorder. It is, however, to be regretted, that general directions only can be given on this subject: the precise adaptation of these principles to individual cases, must depend on the skill, address, and experience of the practitioner.

Insane persons are most advantageously treated when removed from home, and from the interference of their immediate relations and friends. While they remain in their own houses, it is nearly impossible to divest them of the authority which they had been accustomed to maintain; and the salutary regulations of the superintendent are frequently rendered useless, by the mistaken indulgence of their family connections. A system of regularity should be established in their actions; and restraint should instantly be imposed on disobedience. As the deranged person should be taught to view the superintendent of his conduct with respect, the latter should be careful to deserve it by vigilant firmness, and steady decorum. The confidence of the maniac can never be reposed in ignorance and mismanagement, nor can his esteem be imparted to unfeeling and tyrannical assumption. Although it is proper to curb the extravagant follies of the

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patient; yet no advantage appears to be derived from an endeavour to convince him by argument; the less frequently the subjects of his delusion are referred to, the more easily he becomes managed. When the insane are convalescent, the occasional visits of their friends are attended with manifest advantage: such intercourse brightens the prospects of future life, and often acts as a stimulus to self-restraint. But in certain states of the disorder, where pride, malevolence, and cunning, form the leading features of derangement, the ill-timed admission of friends has been signally prejudicial: it has tended to unfix the authority of the superintendent, and introduced a train of afflictions which has aggravated the malady. Of the beneficial effects of mild and humane treatment in this disorder, Mr. Hallam says, "Speaking of the effects of management on an extensive scale, I can truly declare, that by gentleness of manner, and kindness of treatment, I have seldom failed to obtain the confidence and conciliate the esteem of insane persons; and have succeeded by these means in procuring from them respect and obedience. There are certainly some patients who are not to be trusted, and in whom malevolence forms the prominent feature of their character: such persons should always be kept under a certain restraint, but this is not incompatible with kindness and humanity."

Deception on the part of the medical superintendent should never be resorted to. The late Dr. John Monro emphatically observes, "The physician should never deceive them in any thing, but more particularly with regard to their distemper; yet as they are generally conscious of it themselves, they acquire a kind of reverence for those who know it, and by letting them see that he is thoroughly acquainted with their complaint, he may very often gain such an ascendant over them, that they will readily follow his directions." Formerly coercion was employed with a degree of severity, that amounted to vindictive punishment: recourse was had to the whip, and stripes were actually inflicted by medical direction. The more rational and humane treatment of modern practitioners, has induced them to employ coercion only as a protecting restraint; to guard the patient from doing mischief to himself, or offering violence to others; and for this purpose the straight-waistcoat is usually sufficient.

Medicine.—An enumeration of all the remedies which have been proposed, and strongly recommended for the cure of mental derangement, would extend this article to an unprofitable length. The ancient physicians principally confided in a species of hellebore, which was cultivated with the greatest attention, prepared with the utmost care, and exhibited under particular cautions; but concerning these matters there was unfortunately much diversity of opinion. Considering the various and opposite states of mental derangement, a rational mind would scarcely expect any particular drug to possess powers adequate to the restoration of reason. If insanity be a disease of the *mind itself*, corporeal remedies can be of little utility; if an affection of the brain, and nervous system, no particular medicine can be supposed capable of restoring the various lesions, which anatomical investigation has detected.

When the experience of eminent practitioners is at variance; when remedies, which have been extolled for their virtues and successful operation by one medical writer, have been asserted by another to be impotent and unprosperous, the subject of cure becomes entangled with insuperable difficulties. Modern practitioners are nearly agreed, that at the commencement of this disorder, *bleeding* may be employed with advantage; and drawing blood by cupping-glasses has been usually preferred. Little difference of opinion has pre-

vailed concerning the utility of *cathartics*: some practitioners have, however, preferred particular articles of this tribe, as elaterium, calomel, jalap, &c.; while others have succeeded with the milder purgatives, as fenna, and the solutions of neutral salts, with the addition of a small quantity of the antimonium tartarizatum. As recovery is often preceded by a spontaneous diarrhœa, purgative medicines may be esteemed, under a judicious exhibition, of signal utility in most cases of mental derangement.

Emetics.—Practitioners are much divided in opinion respecting the propriety of administering vomits as a remedy for insanity. The late Dr. John Monro thought “the evacuation by vomiting infinitely preferable to any other.” Dr. Cox is equally partial to emetics as a cure for mental derangement. Mr. Haslam, however, entertains an unfavourable opinion of them: he states that, in some instances, paralytic affections have supervened within a few hours after the exhibition of an emetic; more especially when the patient has been of a full habit, and has had the appearance of an increased determination to the head. Perhaps in melancholia, emetics may be more generally advantageous; and in furious mania, the same remedies may be employed merely in nauseating doses, to prevent the severe convulsion of vomiting.

Opium has seldom procured sleep, when given in the furious state of insanity. Notwithstanding the encomium of this remedy by Bernard Heute, the respectable testimonies of Dr. Ferriar and others have not induced any expectation of benefit from its employment. Dr. Chiarugi deposes to the sedative effect of a watery solution of opium, applied to the internal membrane of the nose with a camel’s-hair pencil. Of the remaining tribe of narcotic remedies we have little that is satisfactory on record.

Digitalis, though strongly recommended by some, has produced no benefit in the hands of others. Dr. Ferriar expressly states, “that he has given this remedy, even to nauseating doses; but with no advantage. It never suspended the appearances of insanity for a moment.”

Camphor has been much extolled for its virtues in mental derangement; but Dr. Ferriar and Mr. Haslam, who gave it in large doses, did not experience any considerable benefit from the employment of this remedy. Dr. Laughter mentions nine cases of insanity cured by camphor; but in these instances it was combined with vinegar. Dr. Leopold Avenbrugger, in a curious tract entitled “*Experimentum noscens de remedio specifico, sub signo specifico in mania virorum*,” Vienna, 1772, has spoken still more highly of the specific virtues of camphor in this disease. *Blisters* have had their advocates; but it seems to be the opinion of those whose experience has been most extensive, that they succeed better when put to the lower extremities, than applied directly to the head. Issues and setons may in many cases be used with advantage; but they should be allowed to discharge for a considerable time; as their beneficial effects are not immediately apparent.

In some instances the *warm bath* has mitigated the fury of the patient, and in melancholia the use of the *cold bath* has been thought advantageous.

It appears to be a radical defect in almost all the institutions for the insane, that no plan for the *employment* of the patients has been hitherto adopted. Many difficulties certainly occur, as to the nature of the labour in which they ought to be engaged; but a judicious contrivance might surmount them, and appropriate a salutary exercise and amusement to the different classes of the insane.

MENTCHIKOF, ALEXANDER, in *Biography*, a statesman and general under the czar Peter I., was the son of

peasants who were the vassals of the monastery of Cosmopol. At the age of thirteen he went to Moscow to obtain the means of subsistence, and was taken into the service of a pastrycook, who employed him to vend his goods by crying them about the streets of that then celebrated city, now, alas, [Oct. 1812,] desolated by the madness of war. The czar happened one day to hear him, and being struck with the pleasant song which he annexed to his cry, entered into conversation, and, in the end, ordered him to come to court, where he was at first placed in a very low station, but his talents were discoverable in the midst of all disadvantages, and it was seen he had a wonderful facility in acquiring several languages. The czar took him to serve about his person, and he was from that time gradually advanced to the highest employments, till at length he became one of the most successful generals in the Russian army. When Peter went on his travels for improvement, he took Mentchikof for his companion, and, in 1706, he was created a prince of the German empire, and was, after this, frequently employed on occasions of ceremony to personate the czar, who chose rather to appear as a private person in his train. He was victorious over the Swedes, in the war against Charles XII., and had the command of the left wing of the Russians at the decisive battle of Pultowa, in the year 1709. His situation enabled him to acquire great wealth, but in 1715 he was called to an account for certain abuses of the administration, and fell under the censure of his sovereign. He was afterwards restored to his favour, and even placed at the head of the council of regency, when Peter set out on his expedition to Persia. He greatly contributed to the succession of the empress Catherine at the death of Peter, and upon her demise he took measures to insure the crown to Peter Alexievitch, on condition that he should espouse his eldest daughter. The accession took place in 1727, and Peter was betrothed to his intended bride. Mentchikof now assumed all the arrogance of uncontrollable sway, which in a very short time occasioned an order for his arrest: this was followed by a decree of banishment. It was intended to confine him to his own estate; he imprudently left the capital with a splendid train, which his enemies construed into marks of contempt for the emperor, who readily dispatched an order to carry him prisoner to Siberia. The place of his confinement was Berefok, on the rude and desolate banks of the Oby. His wife, who had been delicately brought up, wept herself blind, and expired in the course of her journey. His own mind soon accommodated itself to his situation. He cultivated a small farm, and, by industry and frugality, saved enough from his daily pittance, of ten rubles, to build a wooden church, in the erection of which he assisted with his own hands. He died in November 1729, little more than two years from the time of his banishment. Univer. Hist.

MENTHA, in *Botany*, an ancient Latin word, mostly written *Menta*, adopted from the Greeks, whose *μινθῆ* is synonymous with their *ῥόδισμος*; the latter being most generally used; see Dioscorides, book 3. chap. 41. The nymph Mintha, a favourite of Pluto, is fabled to have been changed by Proserpine into this herb, as incidentally mentioned by Ovid; *Metam.* book 10. 729.—*Mint*.—Linn. *Gen.* 291. Schreb. 387. Willd. *Sp. Pl.* v. 3. 74. Mart. *Mill. Dict.* v. 3. Sm. *Fl. Brit.* 609. *Tr. of Linn. Soc.* v. 5. 171. *Prodr. Fl. Græc.* Sibth. v. 1. 402. Brown. *Prod. Nov.* Holl. v. 1. 505. Ait. *Hort. Kew.* ed. 2. v. 3. 387. Juss. 113. *Tourn.* t. 89. Lamarck *Dict.* v. 4. 102. *Illustr.* t. 503.—Class and order, *Didymia Gymnospermia*. *Nat. Ord. Verticillatae*, Linn. *Labiatae*, Juss.

Gen.

MENTHA.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, erect, with five nearly equal teeth, permanent. *Cor.* of one petal, erect, tubular, somewhat longer than the calyx; limb in four deep, nearly equal, segments, the uppermost only being rather the broadest, and cloven. *Stam.* Filaments four, awl-shaped, erect, distant, the two nearest ones longest; anthers roundish. *Pist.* Germen superior, four-cleft; style thread-shaped, erect, longer than the corolla; stigma in two divaricated divisions. *Peric.* none, except the permanent straight calyx. *Seeds* four, small, generally abortive.

Ess. Ch. Calyx five-cleft, nearly equal. Corolla nearly equal, four-cleft; its broadest segment cloven. Stamens erect, distant.

This is one of the most natural genera possible; well marked in habit and characters. The herbage, and even the flowers, abound with resinous dots, the seat of an essential oil, on which the warm and aromatic qualities of these plants depend. Their flavour is different in the different species, and variable in the same, but on the whole almost peculiar to the genus. The following characters apply to the species in general. *Root* creeping, perennial. *Stems* square, branched, leafy. *Leaves* opposite, simple, undivided, generally serrated. *Flowers* in stalked many-flowered whorls, which are either axillary, capitate, or spiked. *Calyx* striated, or ribbed, rather dilated upward, almost regular, either naked, or clothed more or less completely with simple hairs, whose direction differs in different species, but is very constant in the same. Very rarely this part is covered with soft downy pubescence. *Corolla* funnel-shaped, purplish. *Stamens* inserted into its tube; when perfect generally longer than the limb. *Herbage* generally more or less hairy.

Mentha is principally an European and British genus. There are however some American and even East Indian species. Those of our own country have always been found extremely difficult to determine. Neither the shape of the leaves, general pubescence, length of the stamens, nor even the inflorescence, all which have been resorted to by botanists, has been found constant or certain. The writer of this article first proposed a mode of distinction, founded on the pubescence of the calyx and flower-stalks, and its various direction. By this clue all the British species are settled in the Transactions of the Linn. Soc. and Fl. Brit. above quoted, and we shall here apply it to the exotic ones. For want of having received information of this mode of discrimination, Willdenow has greatly failed in his view of the species. The same may, in some measure, be said of Mr. Sole of Bath, who published, in 1798, a Botanical Arrangement of the British Mints, in folio, with 24 plates; a work nevertheless of much original observation, and more correct as to species than most that had preceded it; though no attention is paid by his draughtsman to the pubescence of the calyx, in which respect no dependence whatever can be placed on his figures.

1. *M. auricularia*. Ear Mint. Linn. Mant. 81. Mat. Med. ed. 4. 169. Dale Pharmac. 160. Stokes Mat. Med. v. 3. 310. (*M. fetida*; Burm. Ind. 126. *Majana fetida*; Rumph. Amboin. v. 6. 41. t. 16. f. 2.)—Spikes tapering, close, hairy. Leaves ovate, coarsely serrated; hairy and green on both sides. Bractees ovate.—Native of the East Indies. We have it from China, as well as from Java. The stem is densely clothed with long, shaggy, tawny, horizontal hairs. Leaves on very short hairy stalks, ovate or somewhat oblong, bluntish, coarsely and unequally serrated, from one to two inches in length, various in breadth; bright green above, and clothed with numerous, scattered, silky hairs; a very little paler beneath, finely dotted, not at all hoary, the

ribs and veins extremely hairy. Spikes solitary, terminal, an inch or two long, tapering, close and interrupted; each whorl accompanied by a pair of opposite, ovate, fringed bractees, each pair crossing the next. Flowers crowded, small, nearly sessile. Calyx bell-shaped, spreading, with five broad blunt teeth, which are fringed with numerous hairs, the rest of the calyx being smooth and even, besprinkled with shining glandular dots. Corolla twice as long as the calyx, somewhat hairy. Stamens a little prominent.—This herb is celebrated as a powerful remedy for deafness. We have already mentioned, see HYDROPS, that Linnæus confounded it, at one time, with our second species of that genus, than which few plants can be more distinct.

2. *M. quadrifolia*. Downy Four-leaved Mint. Rottl. MSS.—Leaves linear-lanceolate, serrated, downy on both sides; those of the stem four in a whorl. Spikes cylindrical, very long, close, hairy. Bractees linear-lanceolate.—Sent by Dr. Rottler from Madras. The whole plant is clothed with dense velvet-like down. Stem nearly round, with whorled branches. The leaves on the latter are opposite only; those of the stem four in each whorl; all narrow, bluntish, with shallow serratures. Spikes terminal, solitary, cylindrical, very close, the principal one about six inches long, those of the branches much smaller. Bractees lanceolate, or linear, minutely hispid. Flowers innumerable, crowded. Calyx bell-shaped, even, most hairy in its upper part, especially about the teeth. Corolla hairy. Stamens and style prominent.—We are much inclined to suspect this may be the *Stoechada-mentha*, Linn. Zeyl. 194, *Mentha zeylanica camphorata hirsuta*, Burm. Zeyl. 157; but the descriptions of the inflorescence, in these works, do not accord with our plant; the spikes or heads being there implied, if not positively said, to be short, whereas in our specimen they are remarkably long.

3. *M. verticillata*. Smooth Whorl-leaved Mint. Rottl. MSS.—Leaves linear-lanceolate, serrated, smooth, all whorled. Spikes solitary, cylindrical, somewhat interrupted. Calyx longer than the bractees, with blunt, spreading, very hairy teeth.—Sent by Dr. Rottler from Madras. The herbage is nearly smooth. Stem striated, almost round, tumid above and below each joint, with whorled branches and leaves. The latter are linear, tapering at each end, furnished with shallow distant serratures. Spikes terminal, solitary, cylindrical, from one to two inches long; their whorls tumid and slightly interrupted, with short concealed bractees. Calyx funnel-shaped, clothed in its upper half with copious short dense hairs; the teeth obtuse and widely spreading; the inside smooth. Corolla very small, whitish, hairy. Only one seed seems to come to perfection, and this is large, globose and smooth.

4. *M. stellata*. Stellated Cluster-spiked Mint. Lour. Cochin. 361. *Rau ngu hoang* of the Cochinchinese.—Leaves oblong, obtuse, serrated, smooth, four in a whorl. Spikes clustered, oblong.—Found by Loureiro in moist uncultivated ground in Cochinchina. Stem a foot high, with four furrows. Leaves stellated, four in a whorl. Flowers minute, pale violet. Calyx erect, with sharp teeth. Stamens surrounded about the middle with long hairs. Seeds four, roundish.—We know nothing of this species but from the author quoted. The clustered spikes mark it as distinct from the last.

5. *M. incana*. Hoary Slender-spiked Mint. Sole MSS. Donn. Cant. ed. 5. 142. (*M. chalepensis*; Mill. Dict. ed. 8. n. 10. *Menthatrum chalepense angulifolium*, raro florens; Boerh. Lugd.-Bat. ed. 2. v. 1. 185.)—Leaves ovate-oblong, serrated, nearly sessile, very soft and downy on both sides. Spikes solitary, very slender.—Native of Aleppo.

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Hardy in our gardens, but it rarely flowers, unless, as Miller says, it be confined in a pot. The *stem* is square, a yard high, purplish, minutely hairy, roughish to the touch, leafy, with numerous opposite branches. *Leaves* from one to two inches long, nearly or quite sessile, ovate-oblong, or somewhat elliptical, acute, finely and sharply serrated, entirely clothed with fine, short, dense, hoary pubescence. The *flowers* we have never seen. This species seems nearest akin to the *sylvestris*.

6. *M. sylvestris*. Horse Mint. Linn. Sp. Pl. 804. Engl. Bot. t. 686. Fl. Dan. t. 484. (*M. villosa*; Sole Menth. t. 1 and 2. *M. rotundifolia*; Sole Menth. t. 4. Menthastrum; Ger. em. 684 Riv. Monop. Irr. t. 51. f. 1. Camer. Epit. 479. Fuchs. Hist. 292. *M. hortensis fecunda*; ibid 298.)—*Leaves* acute, with tooth-like serratures, chiefly downy beneath. Spikes hairy, slightly interrupted. Bractees awl-shaped.—Native of waste ground, in rather moist situations, throughout Europe, flowering, like most of the genus, towards autumn. The *stem* is from two to four feet high, square, shaggy with hairs pointing downwards. *Leaves* sessile, of a grey and hoary aspect, whitish underneath, with a strong disagreeable scent for the most part, though some German and Swiss varieties are said to be agreeably fragrant. Their shape varies greatly, from oblong, or ovate, to a very broad, almost orbicular, figure, as may be seen by the different figures above cited. The *spikes*, solitary at the end of every branch, are thick, various in length, consisting of crowded, many-flowered, hairy whorls, with long, linear, acute, hairy bractees, the lowermost of which are broadest. *Flower-stalks* covered with closely deflexed hairs. *Calyx* all over hairy, with long sharp teeth. *Corolla* pale lilac, hairy, twice as long as the calyx. *Stamens* occasionally longer or shorter than the corolla, generally the latter.

We have from Switzerland, under the name of *M. suavis* of Hoffmann, a narrow sharp-leaved variety of this; and from Pyrmont, one with broad ovate leaves, as *M. gratissima* of Ehrhart, see Hoffm. Germ. for 1791. 203; both have very hoary spikes. We presume the latter is the identical *M. suaveolens*, Ehrh. Beitr. fasc. 7. 149, but the synonyms there given all belong to the real *rotundifolia*, than which nothing can less deserve the name of *suaveolens*. Willdenow quotes Ehrhart, with doubt, but rightly, under his own *nemorosa*, which is merely the ovate variety of *sylvestris*. The *gratissima* of Willdenow is a repetition of the same.

7. *M. niliaca*. Egyptian Mint. Jacq. Hort. Vind. v. 3. 46. t. 87.—*Leaves* ovate, acute, serrated, hairy on both sides; paler beneath. Spikes clustered. Stamens much longer than the corolla, smooth.—Native of Egypt. As Vahl and Willdenow adopt this species, and we have seen no specimen, we would not presume to refer it absolutely to the last, but we are much persuaded that it is a mere variety. Jacquin describes the *leaves* as villous, though green on both sides; Vahl says they are, in the wild plant, soft and hoary. The length of the *stamens*, though striking, is by no means to be relied on for a specific character.

8. *M. glabrata*. Smooth Spiked Mint. Willd. n. 6. Vahl. Symb. v. 3. 75. (*M. kalirina*; Forsk. Egypt-Arab; 213.)—"Leaves stalked, ovate-lanceolate, serrated, smooth. Flowers in whorled clusters."—Found by Forskall about Cairo in Egypt. The whole *plant* is said to be smooth. *Leaves* half an inch (we presume) in breadth, dotted beneath. *Cluster*, or *spike*, terminal of course. *Whorls* with rine umbellate flowers at each side. *Bractees* linear, the length of the whorls. *Stamens* shorter, and *style* longer, than the corolla.—Our account is taken from Willdenow, who copies Vahl. The latter examined Forskall's specimen.

9. *M. rotundifolia*. Round-leaved Mint. Linn. Sp. Pl. 805. Engl. Bot. t. 446. (*M. crispa*; Linn. Sp. Pl. ed. 1. 576. *M. sylvestris*; Sole Menth. t. 3. Menthastrum anglicum; Riv. Monop. Irr. t. 51. f. 2. *M. niveum* anglicum; Ger. em. 684.)—*Leaves* elliptical, obtuse, rugged, crenate, villous beneath. Spikes interrupted, somewhat hairy. Bractees lanceolate.—Native of Germany, Switzerland, and England, in waste marshy ground. With us it is rather rare. In a variegated state, as described by Gerarde, it often occurs in gardens, and is sometimes almost entirely white, like blanchéd endive. This, which Mr. Sole unaccountably mistook for the *sylvestris*, is totally distinct from every variety of that species. The invariably short, roundish, convex, and obtuse *leaves*, rugose, of a dark grass green, (not grey or hoary,) above; strongly reticulated with very hairy veins, but not hoary, beneath; and the very peculiar strong smell, and viscosity, of the whole plant, mark it with sufficient precision. The *spikes* are often clustered or panicked, more or less interrupted. *Bractees* ovate, sharp-pointed, prominent. *Flower-stalks* clothed with deflexed hairs. *Calyx* short, bell-shaped, hairy all over, with long, sharp, coloured teeth. *Corolla* much like that of *sylvestris*. *Stamens*, as far as we have observed, always longer than the petal.

Mr. Sole greatly commends this mint for its stimulating refreshing virtues, to which we can readily give credit, on account of its powerful scent, well compared by that writer to a mixture of volatile salt of amber, camphor, and mint. He found it of great use in *chlorosis*, and not without some effect in epilepsy. He mistakes however in thinking it the "true *Menthastrum*, or Wild Horse Mint, of the shops." That plant of Dale's *Pharmacologia*, 159, our best authority, is certainly the *sylvestris*; described above. The *Mentha sylvestris* of Dale, as well as of Sole, is our *rotundifolia* here described. This is the more important to be observed, as the plants are probably very different in qualities.

10. *M. viridis*. Spear Mint. Linn. Sp. Pl. 804. Engl. Bot. t. 2424. Woodv. Med. Bot. t. 170. Sole Menth. t. 5. (*M. romana*; Ger. em. 680.)—*Leaves* sessile, lanceolate, acute, naked. Spikes interrupted. Bractees bristle-shaped, more or less hairy, as well as the teeth of the calyx.—Native of moist meadows, in various parts of Europe. In gardens it is sufficiently well known, by the names of Spear Mint, and Mackerell Mint, and is the *Mentha*, simply so called, of the shops, the first species in Dale's *Pharmacologia*; being the only kind, except Peppermint next mentioned, retained in the most recent London *Pharmacopœia*.—There are however several remarkable varieties of this species, wild in England, whose flavours and qualities differ from the best or cultivated kind; though the latter is also a native of the southern parts of our island. The *stems* are two or three feet high, erect, smooth, with sharp angles, branched, often purplish. *Leaves* sessile, lanceolate, acute, sharply serrated, or in some cases toothed, smooth, except an occasional hairiness beneath. They are strongly veined, and in the varieties just alluded to, they are considerably rugose, as well as of a broader and shorter figure. In an exotic variety, whose history is given in Trans. of the Linn. Soc. v. 5. 187, 188, and from which the description of Miller's *rubra*, n. 9, of his 8th edition, was made, the *leaves* are broadly ovate, with long wavy teeth, almost like *M. crispa*, hereafter mentioned. The *spikes* are always more or less interrupted, tapering. *Bractees* awl-shaped, very slender at the point, keeled, roughish, sometimes three-cleft, the lower and larger ones mostly assuming an ovate form. *Flower-stalks* always smooth, round and shining. *Calyx* ribbed,

ribbed, tapering at the base, and equally smooth and naked in that part, but the teeth are fringed, more or less conspicuously, even in the garden variety, and very copiously in the more common wild ones, with hoary hairs. The *corolla* is smooth. *Stems* various in length.

This species may be known, in all cases, from the *sylovestris*, with which some of its varieties have often been confounded, by the invariably smoothness of its *flower-stalks* and base of the *calyx*. The varieties with shorter rugose *leaves*, and most hairy *calyx-teeth*, have the most strong and disagreeable flavours, and are not fit for the uses of the table. Another variety has been sent us by the Rev. Dr. Muhlenberg, from Pennsylvania, of a diminutive stature, with ovate *leaves*, not an inch long at the utmost, but in every essential character agreeing with the above.

11. *M. piperita*. Pepper Mint. Sm. Fl. Brit. n. 4. Engl. Bot. t. 687. Hudf. 251. Woody. Med. Bot. t. 169. Sole Menth. t. 7, 8, and 24. Ehrh. Pl. Off. 216. Willd. n. 13. (*M. spicis brevioribus et habitioribus, foliis Menthae fuscæ, sapore fervido piperis*; Raii Syn. 234. t. 10. f. 2.)—Leaves stalked, ovate, smoothish. Spikes obtuse, interrupted in their lower part. Calyx very smooth at the base.—Native of watery places in various parts of England, but it seems not to have been found wild any where else. In gardens it is every where cultivated, for the sake of its valuable medicinal properties, which are of a stimulating or stomaehic kind, and exist in great perfection in the essential oil and distilled water. It appears by the Linnæan herbarium, and we think also by the Mat. Med. of Bergius, 516, though his description unfortunately omits what would absolutely decide the question, that the Pepper Mint cultivated in Sweden is not our's, but a high-flavoured variety of *M. hirsuta*, which, even in the old Linnæan specimen, still retains the taste of real Pepper Mint. Its *calyx* is entirely clothed with ascending hairs, the *flower-stalks* with deflexed ones, the essential characters of *M. hirsuta*; whereas the *piperita* has the *calyx-teeth* only hairy, the lower part of the *calyx*, and that of the *stalks*, being always remarkably smooth and polished. Hence it appears why Linnæus reckoned his *piperita* among the capitate species. Our's is truly spiked, though the spikes vary in length, and are usually blunter than in the *sylovestris* and *rotundifolia*. Mr. Sole's plates well display the two extremes, but we can easily trace one variety into the other.

The *stem* of *M. piperita* is generally two or three feet high, purplish, with some scattered deflexed hairs, and numerous opposite branches. *Leaves* on stalks of a moderate length, ovate, acute, more or less elongated, and varying from one to three inches in length, sharply serrated; dark green and nearly smooth above; paler beneath, with many, parallel, whitish or purplish, hairy veins. The *spikes* are thick, with lanceolate, fringed, long-pointed *bractæas*; one or two of their lower whorls often very distant. *Flower-stalks* sometimes a little hairy in their upper part. *Calyx* as above described, its teeth sharp, mostly purple. *Corolla* purplish, smooth, longer than the *stamens*.—The flavour of the whole herb is pungent, highly aromatic, leaving a coolness in the mouth, like camphor, and finally a disagreeable bitterness. We have gathered, truly wild, in the romantic dale of Bonfall, near Matlock, the precise Pepper Mint of the gardens, in its highest perfection, with elongated spikes; which is of rare occurrence in a wild state.

12. *M. crispata*. Curled Mint. Linn. Sp. Pl. 805. Berg. Mat. Med. 513. Ehrh. Pl. Off. 206. Riv. Monop. Irr. t. 50. (*M. n. 230*; Hall. Hist. v. 1. 100. *M. crispata danica*; Morif. sect. 11. t. 6. f. 5.)—Leaves sessile, heart-shaped, wavy, strongly toothed. Spikes capitate, blunt.

Teeth of the calyx, and top of the flower-stalks slightly hairy. Native of Siberia, according to Linnæus. Haller considered it as merely the weed of gardens in Switzerland. With us it is only seen in a cultivated state, and that but rarely. The *stems* are three or four feet high, rather bluntly quadrangular, clothed with a few hairs curved downward, but little branched, leafy. *Leaves* numerous, nearly or quite sessile, heart-shaped, somewhat pointed, short and very broad, wavy and plaited, with very strong, twisted, crowded, acute, marginal teeth; nearly smooth above; slightly hairy beneath; the veins all radiating, as it were, from the lower part of the midrib. *Spikes* usually short, capitate, and very blunt; sometimes more elongated and tapering, as in the plate of Rivinus. *Bractæas* broad, recurved. *Flower-stalks* smooth, except a roughness, or slight hairiness, at the very summit. *Calyx* ribbed, tumid at the base, contracted a little higher up, smooth, except a few marginal hairs on the long and sharp teeth. *Corolla* smooth, purplish, rather longer than the *stamens*.—This is most akin in foliage to the exotic variety of *M. viridis* above-mentioned; nor do their *calyces* or *flower-stalks* much differ. We are by no means certain that it ought not likewise to be considered as a form of *viridis*. The original *crispata* of Sp. Pl. ed. 1, is no other than *rotundifolia*, which is also the *crispata* of Jacquin. As the specimen came from Siberia, it seems to have caused Linnæus to attribute that *habitat* to the species, which thus proves erroneous. Roth says the true *crispata*, which by his description he seems to understand, is found in watery places near Rübeland in Hercynia.—*M. dentata*, Willd. n. 15, seems by his own suggestion, as well as the description, to be a whorled variety of this.

13. *M. odorata*. Bergamot Mint. Sm. Fl. Brit. n. 5. Engl. Bot. t. 1025. Sole Menth. t. 9. (*M. citrata*; Ehrh. Beitr. fasc. 7. 150. Willd. n. 13. *M. rubra*; Mill. Dict. ed. 8. n. 9, with a false description, as mentioned under *M. viridis*.)—Leaves stalked, heart-shaped, naked on both sides. Spikes capitate, very blunt. Calyx and flower-stalks perfectly smooth.—Native of watery places in Cheshire and North Wales. Sole. Willdenow thinks it may possibly be wild in the Palatinate. In gardens it is often preserved, for the sake of its fine scent, resembling that of the Bergamot Orange, being more powerful than *Monarda didyma*. The whole *herb* often assumes a dark purplish hue, in which it agrees with *piperita*; but it differs from all the Mints known to us, at least all that otherwise approach it, in being perfectly destitute of hairiness throughout. The *leaves* are broad, short, and heart-shaped. *Inflorescence* more truly capitate than in any variety of the Pepper Mint, and agreeing with the capitate state of *M. hirsuta*, n. 14, from which the uniformly smooth *flower-stalks* and *calyx* always keep it very distinct.

14. *M. hirsuta*. Hairy Mint. Sm. Fl. Brit. 616. α, with short round terminal heads. *M. hirsuta*; Linn. Mant. 81. Sm. Tr. of L. Soc. v. 5. 193. Hudf. ed. 1. 223. Engl. Bot. t. 447. (*M. aquatica*; Hudf. 252, α and β. Sole Menth. t. 10, 11. *M. aquatica*, five *Sisymbrium*; Raii Syn. 233. Ger. em. 684. *M. palustris spicata*; Riv. Monop. Irr. t. 49. *M. Sisymbrium dicta hirsuta, glomerulis ac foliis minoribus ac rotundioribus*; Dill. in Raii Syn. 233. t. 10. f. 1. *M. piperita*; Linn. Sp. Pl. 805. Berg. Mat. Med. 516. *Origanum vulgare*; Fl. Dan. t. 638!) β, with a more elongated terminal head, or blunt spike. *M. hirsuta* δ and ε. Fl. Brit. 617. (*M. palustris*; Sole Menth. t. 6. *M. paludosa*; ibid. t. 22. *Menthastris aquatica* genus *hirsutum, spicâ latiore*; Bauh. Hist. v. 3. p. 2. 222. Raii Syn. 234. *M. minus*; Ger. em. 685.)

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γ , with whorled flowers. *M. hirsuta* ζ -9; Fl. Brit. 17. (*M. fativa*; Linn. Sp. Pl. 805, excluding the synonyms. Sm. Tr. of L. Soc. v. 5. 109. Engl. Bot. t. 448. *M. rivalis* β , γ , and δ ; Sole Menth. 45.)

Leaves stalked, ovate. Flowers capitate or whorled. Calyx entirely clothed with hairs curved upwards. Flower-stalks rough with deflexed hairs.—Common in watery places throughout Europe. This is the most variable species of the whole. It is often purplish; always more or less hairy, and in general remarkably so; the hairs of the *stem*, *branches*, and *flower-stalks* all curved downward, those of the *foot-stalks*, *leaves*, and especially those which clothe the *calyx*, all turned forward or upward. The direction of the pubescence never varies, though its quantity is extremely variable. We have a wild specimen, which to the naked eye looks nearly as smooth as the *odorata* last described, but which is, indeed, minutely hairy, especially the *calyx* and *stalks*. The root that bore this, being transplanted into a neighbouring garden, produced, the following year, a plant as hairy as any variety we have seen. The smell of the present species is likewise changeable. In general it is pungent and aromatic, much like Spear Mint, but sometimes acquires the flavour of Pepper Mint, or of Camphor, and occasionally a very sweet odour, like Frankincense Thyme, very lasting in specimens seventy years old, and which is now and then found in the, usually fetid, *M. arvensis*. The *stems* are upright, mostly branched, in the manner of *M. odorata*. *Leaves* stalked, ovate, rather acute, but sometimes blunt, serrated, very variable in size; their veins strong and parallel. *Flowers* purplish; in the first variety, α , capitate, like those of *odorata*, with one or two dense, distant, stalked, axillary whorls below; in β , so many whorls terminate the stem or branches as to form a bluntish spike, still accompanied by a distant whorl, or rather a pair of stalked axillary heads, underneath; this has been made a species by most authors, but it has all the essential characters of α , into which we have observed it to change, even in a wild state, according to changes in the moisture of the soil; this is the *palustris* of Sole, t. 6; his *paludosa*, t. 22, has the whorls sessile, and more numerous, so as more nearly to resemble a properly whorled mint, which plants of this kind, from Mr. Sole, have completely become in our garden; in γ , which like α varies in size, hairiness, colour, and flavour, the inflorescence is entirely whorled throughout. It is not without repeated observations on these plants in their wild state, and long cultivation of them in two different gardens, one wet, the other dry, that we have been decided in considering these different forms of inflorescence, in the *M. hirsuta*, as constituting no specific distinction. We have indeed specimens which shew the change from α to γ . This is a point nevertheless which theoretical botanists find difficult to allow, and which nothing but great experience can establish. See a similar instance mentioned at the end of our 12th species.

15. *M. acutifolia*. Fragrant Sharp-leaved Mint. Fl. Brit. n. 7. Engl. Bot. t. 2415. (*M. verticillata*; Mill. Dict. ed. 8. n. 17.)—Flowers whorled. Leaves ovato-lanceolate, tapering at each end. Calyx hairy all over. Hairs of the flower-stalks spreading.—The only specimen we have ever seen, was gathered by Rand, at the side of the river Medway, in Kent. Miller says the plant grew between Rochester and Chatham, where Mr. Sowerby has sought it in vain. We doubt its being distinct from *M. hirsuta*, but the much more spreading hairs of the *flower-stalks*, first induced us to think it more than a variety. The very sweet scent, like frankincense thyme, agrees with a variety above-mentioned of *hirsuta*, nor perhaps can the tapering bases of the *leaves* be thought of more importance, as the foliage of the

latter species is acknowledged to vary much. The *whorls* are all quite sessile. *Calyx* clothed with ascending hairs, especially at the base, by which this plant is essentially distinguished from *rubra*, n. 17, while the hairy *flower-stalks* distinguish it from the following.

16. *M. canadensis*. Canadian Mint. Linn. Sp. Pl. 806. Ait. Hort. Kew. n. 13.—Flowers whorled. Leaves ovato-lanceolate, tapering at each end. Footstalks twice as long as the whorls. Calyx hairy all over. Flower-stalks quite smooth.—Gathered in Canada by Kalm. It was sent in 1801, by the late Mr. Masson, to Kew garden, where it lives in the open air, flowering in July. No figure of this species has yet appeared. It is more nearly allied to our *acutifolia*, than to the *arvensis*, with which Linnæus compares it. The long slender *footstalks*, sharply serrated and more lanceolate *leaves*, and the perfectly smooth and naked *flower-stalks*, are its discriminating characters. The *calyx* is hairy all over, with more erect hairs than in *arvensis*. The *whorls* are accompanied by long linear *bractæas*.

This should seem to be *M. borealis* of Michaux. Boreal-Amer. v. 2. 2; while his *tenuis* appears to be our small American variety of *viridis*, mentioned under that species; but having seen no specimens, we decline a positive reference to his work.

17. *M. rubra*. Tall Red Mint. Tr. of L. Soc. v. 5. 205. Engl. Bot. t. 1413. (*M. fativa*; Sole Menth. t. 21. *M. verticillata*; Raii Syn. 232. Riv. Monop. Irr. t. 48. f. 1. *M. fativa rubra*; Ger. em. 680. *M. pratensis*; Sole Menth. t. 17. (See Tr. of L. Soc. v. 5. 275.)—Flowers whorled. Leaves ovate. Stem upright, zigzag. Flower-stalks and lower part of the calyx very smooth; teeth hairy. Found about ditches, wet hedges, and the borders of rivers, not unfrequently, in England. Foreign writers seem unacquainted with this, which is the tallest and handsomest of our Mints, rising to the height of four, five, or six feet, with a red, wavy, usually smooth *stem*, bearing few and short branches. *Leaves* ovate, stalked, of a dark shining green, often very broad, with strong serratures; the upper ones small and short. *Whorls* numerous, stalked, of many large purplish-red *flowers*, with linear fringed *bractæas*. *Calyx* tubular, dotted with numerous resinous points, quite smooth, like the *flower-stalks*, except the teeth, which are always more or less furnished with upright hairs. The whole plant has a strong aromatic scent, especially in a dry soil. We have seen it kept in country gardens, and called Heart Mint, from its supposed cordial qualities. The Rev. Mr. Williams has observed this species in Shropshire, acquiring the peculiar scent of *M. arvensis*, of which we know no other instance.

18. *M. gentilis*. Bushy Red Mint. Linn. Sp. Pl. 805. Engl. Bot. t. 2118. (*M. rubra*; Sole Menth. t. 18. *M. rivalis* α ; ibid. t. 20. *M. variegata*; ibid. t. 19. *M. arvensis verticillata* varicolor; Morif. sect. 11. t. 7. f. 5.)—Flowers whorled. Leaves ovate. Stem very much branched and spreading. Flower-stalks and base of the calyx smooth.—In watery waste places, but not common. We have it from North Wales, Shropshire, and Somersetshire. Linnæus says it grows in the south of Europe, and Dr. Sibthorp found what he took for this species, and judged to be the $\epsilon\lambda\lambda\upsilon\sigma\mu\omicron\varsigma$ $\alpha\gamma\chi\epsilon\iota\omicron\varsigma$ of Dioscorides, frequent among stubble in Greece, at the end of autumn; but there being no specimen in his herbarium, we cannot be certain of what he intended. This differs widely from the last in having a low, bushy, much-branched *stem*. The whole plant is rather hairy, and on a dry soil pleasantly aromatic. *Leaves* paler, less shining, and more elongated than in *rubra*, as well as more uniform in shape; their veins whitish underneath.

neath. *Whorls* not quite sessile. *Bracts* lanceolate, various in size. *Flower-stalks* round, purple, for the most part very smooth. Upper part of the *calyx* more or less rough, with ascending hairs; base smooth; the whole sprinkled with resinous dots. *Corolla* pale purple, generally a long as the *filaments*. The variety with blotches of yellow on the *leaves*, (Sole's t. 10, figured also in Morison,) when cultivated in a dry gravelly soil, is much improved in scent, and undergoes other changes; the *whorls* often become elevated on long leafy stalks, and the *flower-stalks* rough with deflexed hairs.

19. *M. gracilis*. Narrow-leaved Mint. Sole Menth. t. 16. Fl. Brit. n. 10. (*M. gentilis*; Engl. Bot. t. 449. Sole Menth. t. 15. *M. hortensis verticillata*, ocyimi odore; Morif. feët. 11. t. 7. f. 1.)—Flowers whorled. Leaves lanceolate, nearly sessile. Stem much branched, erect. Flower-stalks and base of the calyx very smooth.—On commons and waste ground, chiefly in watery places. The variety smelling like Basil, *gentilis* of Sole, is said by that author to be "frequent in ditches and waste places, near towns and villages, but scarcely wild." We have seen it in gardens only, where it is sometimes kept for its scent, resembling Basil, or the perfume of the Muscat Grape; but this flavour is not so constant in the living plant, nor so permanent in the dry one, as many others met with in this genus. The ordinary *M. gracilis* has the strong lasting scent of *viridis*, not of the finest kind. The whole *herb* is a little hairy. Stem erect, twelve or eighteen inches high, much branched about the middle, leafy, rough, and reddish. Leaves uniform, lanceolate, acute, sharply serrated, tapering much at the base, but hardly stalked, bright green, slightly clothed with short hairs. *Whorls* generally sessile, with lanceolate hairy *bracts*. *Flower-stalks* round, purple, uniformly and perfectly smooth. *Calyx* tubular, somewhat bell-shaped, purple, with resinous dots; very smooth and naked at the base; furrowed upwards, and clothed towards the top, especially its taper-teeth, with white upright hairs. *Corolla* purplish, bearded at the extremity, longer than the *filaments*.—The Basil-scented variety has deflexed *leaves*; the lower ones ovate; the floral ones often so small, that it assumes the aspect of a spiked mint. Had we not found it by culture extremely variable in these characters, while the *flowers* constantly agree with the true *gracilis*, we might have been tempted to consider this variety a distinct species.

20. *M. arvensis*. Corn Mint. Linn. Sp. Pl. 806. Hudf. 253. Fl. Brit. n. 11. Engl. Bot. t. 219. Sole Menth. t. 12. Ehrh. Pl. Off. 416. Fl. Dan. t. 512. (*M. arvensis verticillata procumbens*; Morif. feët. 11. t. 7. f. 5. *Calamintha aquatica*; Ger. em. 684. *M. procox*; Sole Menth. t. 13.)—Flowers whorled. Leaves ovate. Stem much branched, diffuse. Calyx bell-shaped, clothed all over with horizontal hairs.—Frequent in corn-fields where water stagnates in winter, especially on a sandy or gravelly soil. It is often a troublesome weed, because of the widely-creeping nature of the *root*, and its turgid fleshy shoots, well calculated to retain life in a soil that fluctuates as to humidity. The *stems* are mostly diffuse, and much branched. *Leaves* ovate, inclining to elliptical, obtuse, pale, clothed with rather rigid prominent hairs. *Flower-stalks* shortish, round, generally smooth, sometimes furnished with a few spreading, or slightly deflexed, hairs. *Calyx* shorter, more bell-shaped, and more broadly toothed than in any of the foregoing, and essentially characterised by being clothed all over with horizontally spreading hairs. *Flowers* reddish-lilac, externally hairy.

This species is readily known by its peculiar scent, justly compared to that of blue mouldy cheese, and which Haller

lays he could not endure. The dried specimens strongly retain it. The neat, elliptical, *brother-leaves* of Mr. Sole's *procox*, and its earlier time of flowering, indicate somewhat of a specific difference, but culture and repeated observations have not confirmed it. *M. arvensis*, Jacq. Austr. t. 53. Winkl. n. 10, is with great probability identified by the latter author to be a variety of *arvensis*. Mr. Which has sent us from Mr. Richards's Garden an almost unbranched specimen of *arvensis*, very like Jacquin's figure; but having been no Austrian specimen, we could not bring on the subject. The hairs of the *calyx* and *flower-stalks*, which nobody has properly described, and which is the matter in dispute. Jacquin's plate bears a great resemblance to the *procox*. A variety of *arvensis*, with the flavour of Basil, is the *gentilis* of Mill. Dict. ed. 8. t. 15.

21. *M. argyrea*. Rugged Field Mint. Sol. Menth. t. 14. Engl. Bot. t. 212. (*M. arvensis*; Fl. Brit. t. 24. Tr. of Linn. Soc. v. 5. 213. 216.)—Flowers whorled. Leaves somewhat heart-shaped, strongly serrated, rugose. Stems erect. Calyx bell-shaped, clothed all over with horizontal hairs.—Observed by Mr. Sole in corn-fields and neglected-gardens in Somersetshire. Mr. Barrer finds it very common in Sullex. We have been induced, in the 30th vol. of Engl. Bot. to agree with Mr. Sole in separating this plant from *arvensis*, on account of its upright stem, and roundish-heart-shaped, rugged, dark, strongly serrated leaves, which give it a peculiarly coarse and harsh aspect; all which marks our cultivated and abundantly increasing specimens have now retained for thirteen years without the least variation. The parts of the *flower*, and the scent of the whole *herb*, accord entirely with the *arvensis*.

22. *M. Pulegium*. Common Penny-royal. Linn. Sp. Pl. 807. Woodv. Med. Bot. t. 171. Sole Menth. t. 23. Engl. Bot. t. 1026. (*Pulegium*; Fuchf. Hill. 193. Riv. Monop. Irr. t. 23. f. 1. Brunf. Herb. v. 1. 227. *P. regium*; Ger. em. 671.)—Flowers whorled. Leaves ovate. Stem prostrate. Flower-stalks downy. Calyx hairy all over, with fringed teeth.—Native of watery places in various parts of Europe. This is much smaller than any of the preceding, and is known by its prostrate stems; small, downy, stalked, ovate, reflexed leaves, sparingly serrated; and numerous dense whorls of purplish, sometimes white, flowers, without *bracts*. The *flower-stalks* are always densely clothed with fine short prominent hairs or down. *Calyx* less densely clothed, either with hairs of the same length, or, as is most commonly the case, with longer and more bristly hairs, a little ascending; its teeth fringed with bristles; its mouth closed with hairs. *Corolla* twice the length of the calyx, very hairy externally, shorter than the *filaments*. The broadest segment of the *corolla* is decidedly cloven, as it ought to be in *Mentha*. Some botanists thought they found it otherwise, and on that ground were disposed to separate *Pulegium* as a genus.

The flavour of Penny-royal is peculiarly strong, resembling *Thymus Nepeta*, Fl. Brit., but not confined to these plants. Some *Curile* and *Saturja* have the same scent.

Some old authors distinguished from this the *Mentha aquatica*, *pulegium mas diela*; Tournef. Inil. 190. *Pulegium latifolium alterum*; Bauh. Pin. 222. P. mas; Ger. em. 671.—This is said to differ in having an erect stem. We have carefully examined a specimen in Sherard's herbarium, and have been inclined to make it a distinct species, the leaves being broad and nearly smooth, and the hairs of the *calyx* rather more long and bristly than in any British varieties of *Pulegium*. Still as we perceive gradations among the latter, we prefer leaving the matter as we find it, till living specimens fall in our way. About the following we have less doubt.

MENTHA.

23. *M. tomentosa*. Downy Penny-royal. (*M. aquatica tomentosa minima*; Tourn. Inst. 190. *Pulegium tomentosum minimum*; Bocc. Sic. 40. t. 41. f. 2.)—Flowers whorled. Leaves ovate, hairy. Stem ascending. Flower-stalks densely clothed with horizontal hairs. Calyx covered with long loosely-spreading hairs.—Native of Sicily. We have it from Algiers, sent by the late Monf. Broussonet. Its appearance is altogether much more hairy or shaggy than any variety of *Pulegium*; the mouth of the calyx is entirely clothed with wool rather than hair, and the hairy covering of the flower-stalks is remarkable for its great length and density. If these marks be accidental, we know no other instance of the kind among *Mentha*, yet we confess them rather differences in degree, than in direction, of the pubescence.

24. *M. cervina*. Hyssop-leaved Mint. Linn. Sp. Pl. 807. Willd. n. 21. (*M. n. 222*; Hall. Hist. v. 1. 98. *Pulegium angustifolium*; Moris. sect. 11. t. 7. f. 7. Riv. Monop. Irr. t. 23. f. 2. Ger. em. 672.)—Flowers whorled. Bractæas palmate. Leaves linear. Calyx and flower-stalks smooth.—Native of the south of France. A most distinct and remarkable species. The whole plant is smooth, larger than *Pulegium*, with which it nearly agrees in flavour and qualities. Stem ascending, slightly quadrangular, not much branched. Leaves sessile, linear, keeled, nearly or quite entire; their under side copiously dotted. Whorls large, dense, many-flowered, each accompanied by a pair of broad, rigid, ribbed, palmate bractæas. Calyx tubular, ribbed, with short spinous teeth. Corolla twice as long as the calyx. Stamens prominent.

Two Linnæan species remain to be noticed. These are—*M. exigua*; Linn. Sp. Pl. 806 Sm. Plant. Ic. ex Herb. Linn. t. 38. This is shewn in Tr. of Linn. Soc. v. 3. 18, to be the same plant as *Cunila pulegioides* of Linnæus, and is therefore struck out of the present genus.

M. perilloides. Linn. Syft. Veg. ed. 13. 445. (*Ocimum frutescens*; Linn. Sp. Pl. 832.)—This is indeed distinct from *Perilla ocymoides*, with which some have been disposed to confound it; but so little like a *Mentha*, that it does not concern our present subject; neither is the original specimen sufficient to determine its genus. S.

MENTHA canariensis plumosa. See BYSTROPOGON.

MENTHA, in Gardening, comprehends plants of the hardy herbaceous perennial kind, of which the species cultivated are, the spear-mint (*M. viridis*); the round-leaved mint (*M. rotundifolia*); the curled mint (*M. crispa*); the pepper-mint (*M. piperita*); the red mint (*M. gentilis*); the penny-royal (*M. pulegium*); and the hyssop-leaved mint, or upright penny-royal (*M. cervina*.)

From the first kind not being so hot to the taste as peppermint, and having a more agreeable flavour than most of the other sorts, it is generally preferred for culinary and other purposes. The leaves and tops are used in spring salads, and eaten as sauce with lamb, and, when dried, in soups, &c.

There are several varieties of it, as, the broad-leaved; the narrow-leaved; the curled-leaved; the variegated-leaved; the silver-striped-leaved; and the gold-striped-leaved.

The fourth species, in its external appearance, corresponds with the first sort, for which it may easily be mistaken; but in that the stem is taller, the leaves have scarcely any petioles, and are narrower in proportion to their length, the spikes are longer and composed of more whorls.

In the fifth sort there is a variety with the scent of basil; the orange-scented mint; the gold-striped orange mint; the yellow-orange mint; and the reddish-orange mint.

And the sixth species varies with a white flower, and with

the stems erect, nearly a foot high: the leaves longer and narrower: the whorls of flowers much larger, the stamens longer than the corolla: this is Spanish penny-royal, which has almost superseded the other sort; the stems being more erect, it is easier to tie in bunches, and it comes earlier to flower, and has a brighter appearance,

In the seventh sort there is a variety with white flowers, growing taller than the common one with purple flowers, which is by some preferred to the sixth sort for medicinal use, and called Hart's penny-royal.

Method of Culture in the Mint Kind.—All these plants may be increased with facility by young offset plants or shoots, or by parting their roots, and planting them out in the spring, or by planting cuttings during any of the summer months in a moist soil. After the cuttings are planted, when the season is dry, they should be often watered until they have taken root; when they require no further care, but to be kept clean from weeds. The best method is to plant them in beds about four feet wide, allowing a path about two feet broad between them, to water, weed, and cut the plants; being set four or five inches or more distant in the rows, as the plants spread much at their roots; on which account the beds should not stand longer than three years before planting them again, as by that time the roots become so closely matted, as to rot and decay each other when they are suffered to stand longer.

With regard to the general culture it is that of clearing them from weeds in spring and summer, cutting down all the remaining stalks annually in autumn; removing all weeds; digging the alleys, and spreading a little of the earth over the beds. Plantations thus formed will afford several cuttings every summer, when only wanted young for use, for culinary purposes; but when for drying to keep in winter, or green for distilling or medicinal use, the plants should generally be suffered to stand until nearly full grown, and they are just coming into flower; which being then cut down close, the roots send up another crop fit for cutting again in the beginning of autumn, or towards Michaelmas; each general cutting being always made as close to the ground as it possibly can be done.

Method of forcing Mint on Hot-beds.—Where it is much wanted for salads in the winter and early spring seasons, a hot-bed should be made for this purpose, any time after November till the spring, about two feet thick of dung, covering it with garden frames and glasses, or with mats on arched sticks, which should then be earthed over with rich mould, six inches thick; when a quantity of roots should be taken up from a bed and planted pretty close together upon the surface of the bed, moulding them over an inch deep with fine earth, putting on the lights, or other coverings, keeping them close in the nights and in bad weather, but admitting fresh air in mild weather. The plants soon come up, when fresh air should be admitted in fine weather, and moderate waterings should be given, and they will soon be ready to have their young green tops gathered for use. When the plants are two or three inches high, they are ready for being cropped, after which they presently break out again, and fresh shoots rise from the bottom; so that the same bed furnishes fresh supplies a long time; two beds, made at different times, being generally sufficient for the whole winter use. In this way mint may be obtained young and green from the time that in the natural ground it goes off in autumn until it comes in again in the spring season.

Young mint shoots may also be procured by planting some roots thick in large pots, and placing them in a hot-house,

house, as they quickly shoot and furnish plants of young green mint in such situations.

Where this practice is much attended to, small fresh plantations should be made annually in the open ground for the purpose of furnishing a sufficiency of roots, proper for taking up at forcing time without disturbing those of the principal crops.

Method of Culture in the Penny-yeal Kind.—These may be increased in the same manner as above, and also by their creeping stems, which should be cut off and planted out in fresh beds, allowing at least a foot distance every way. The young shoots planted in the spring in the same way also take root like the other sorts. The proper time for this work is in the early autumn, that the plants may be well rooted before winter.

It is found that in this way the plants are much stronger, and produce larger crops than when planted out in the spring. When the roots remain so close as is generally the case, they are apt to rot in the winter season. They succeed best in a moist strong soil.

It may be noticed that some of the species and varieties may be introduced in the borders and other parts of pleasure grounds, for ornament and variety with good effect.

MENTHA, in the *Materia Medica*. Several species of this genus have some claims on our notice under this head. The *Mentha piperita*, or "pepper-mint," has a more penetrating smell than any of the other mints, and a much stronger and warmer taste, pungent like pepper, sinking as it were into the tongue, and followed by a sensation of coldness. By maceration, or infusion, it readily and strongly impregnates both water and spirit with its virtue. On distillation with water, it yields a considerable quantity of essential oil of a pale greenish-yellow colour, growing of a darker colour by age, very light, subtle, possessing in a high degree the specific smell and penetrating pungency of pepper-mint. According to Dr. Cullen, rectification is particularly necessary and proper for this essential oil. What has been called essence of pepper-mint is, in his opinion, no other than the rectified oil, dissolved in spirit of wine. Rectified spirit, drawn with a gentle heat from the tincture made in that menstruum, brings over little of the virtue of the herb, nearly all its pungency and warmth remaining concentrated in the extract. This plant, it is observed, yields camphor. Its stomachic, antispasmodic, and carminative qualities render it useful in stultent colics, hysterical affections, retchings, and other dyspeptic symptoms, acting as a cordial, and often producing immediate relief. Its officinal preparations are an essential oil, a simple water, and a spirit. The water is prepared by pouring on, *e. g.* a pound and half of pepper-mint, so much water, that, after the distillation, a sufficiency may remain to prevent empyreuma; and distilling over a gallon. The spirit of pepper-mint is obtained by macerating, for 24 hours, a pound and half of pepper-mint dried in a gallon of proof spirit, with water sufficient to prevent empyreuma, and distilling a gallon by a gentle fire.

Mentha viridis, or *sativa*, "spear-mint," is not so warm to the taste as pepper-mint, but having a more agreeable flavour, it is preferred for culinary uses, and more generally cultivated in our gardens. Many virtues are ascribed by the ancients to mint, but the particular species is not ascertained. This, however, is of no great importance in a medical view, as the virtues of all reside in the aromatic flavour, which is common to the whole genus. On drying, the leaves lose about three-fourths of their weight, without suffering much loss of their smell or taste; nor is the smell soon dissipated by moderate warmth, or impaired on keep-

ing. Cold water, by maceration for six or eight hours on the dry herb, and warm water in a shorter time, become richly impregnated with its flavour. By distillation, a pound and a half of the dry leaves communicate a strong impregnation to a gallon of water. the distilled water proves rather more elegant, if drawn from the fresh plant in the proportion of ten pints from three pounds. Along with the aqueous fluid an essential oil distils, of a pale yellowish colour, changing to a red, in quantity near one ounce from ten pounds of the fresh herb in flower, smelling and tasting strongly of the mint, but somewhat less agreeable than the herb itself. Dry mint, digested in rectified spirit, either in the cold or with a gentle warmth, gives out readily its peculiar taste and smell, without imparting the grosser and more ungrateful matter, though the digestion be long continued. The tincture appears by day-light of a fine dark green, by candle-light of a dark red colour: a tincture extracted from the remaining mint by fresh spirit, appears in both lights green: the colour of both tinctures changes, in keeping, to a brown. On gentle distillation, with proof spirit, the spirituous portion which rises at first discovers little flavour of the mint; but as soon as the watery part begins to distil, the virtues of the mint come over plentifully with it. Hence the spiritus menthæ sativæ, P. L., which is prepared by drawing off a gallon of proof spirit from a pound and a half of the dried plant, proves strongly impregnated with the mint.

To spear-mint are to be ascribed the same medicinal qualities which we have noticed of pepper-mint; but the different preparations of the former, though more pleasant, are perhaps less efficacious. It contains much essential oil, but of an odour somewhat less agreeable than that of lavender or marjoram. It is therefore less employed as a cephalic; but it acts very powerfully on the parts to which it is immediately applied, and therefore considerably on the stomach, invigorating all its functions. It acts especially as an antispasmodic, and therefore relieves pains and cholick depending upon spasm. It will also stop vomiting, depending upon such a cause; but there are many cases of vomiting in which it is of no service: and in these cases, anywise depending upon inflammatory irritation in the stomach itself, or in other parts of the body, it aggravates the disease, and increases the vomiting. Practitioners have thought, and we think justly, that the infusion of mint in warm water agrees better with the stomach than the distilled water, which is often somewhat empyreumatic.

Lewis observes, that it is said by some to prevent the coagulation of milk; and hence it has been recommended to be used along with milk diets, and even in cataplasms and fomentations for resolving coagulated milk in the breasts. Upon experiment, the curd of milk, digested in a strong infusion of mint, could not be perceived to be any otherwise affected than by common water; but milk, in which mint leaves were set to macerate, did not coagulate near so soon as an equal quantity of the same milk kept by itself.

The officinal preparations of spear-mint are an essential oil, a conserve, a simple water, and a spirit. Lewis M. M. Cullen M. M. Woodville Med. Bot.

The spear-mint water, aqua menthæ viridis of the London Pharmacopeia, is prepared by pouring on a pound and half of spear-mint so much water, that, after the distillation, enough may remain to prevent empyreuma; and distilling over a gallon. The spirit, spiritus menthæ viridis, is obtained by macerating, for 24 hours, a pound and half of dried spear-mint in a gallon of proof spirit, with water sufficient to prevent empyreuma, and distilling a gallon by a gentle fire.

Menba Pulegium, "Penny-royal mint," has a warm pungent flavour, somewhat similar to mint, but more acrid, and less agreeable both in smell and taste. Its active principle is an essential oil, of a more volatile nature than that of mint, coming over hastily with water at the beginning of the distillation, and rising also in great part with highly-rectified spirit; in taste very pungent, and of a strong smell; when newly drawn, of a yellowish colour, with a cast of green; by age turning brownish.

The pulegium certainly possesses the general properties of the other mints: it is supposed, however, to be of less efficacy as a stomachic, but more useful as a carminative and emmenagogue, and is more commonly employed in hysterical affections. We are told by Boyle, and others, that it has been successfully used in the whooping-cough; but the chief purpose to which it has long been administered is promoting the uterine evacuation. With this intention, Haller recommends an infusion of the herb with steel, in white wine, which he never knew to fail of success. However, in the opinion of Dr. Cullen, mint is in every respect a more effectual remedy than penny-royal; and nothing but the neglect of all attempts to establish principles could have made physicians think of this as a peculiar medicine different from the other species: and conformably to this remark, it may be observed, that this plant is less frequently used now than formerly.

Its official preparations are a simple water, a spirit, and an essential oil. Lewis M. M. Cullen M. M. Woodville Med. Bot.

Aqua pulegii, "Penny-royal water," is prepared by pouring on a pound and half of penny-royal so much water, that, after distillation, enough may remain to prevent empyreuma, and distilling over a gallon. The "spirit of penny-royal" is obtained by macerating, for 24 hours, a pound and half of dried penny-royal in a gallon of proof spirit, with water sufficient to prevent empyreuma, and distilling a gallon by a gentle fire. The water which distils over with the oils of pepper-mint, spear-mint, and penny-royal, is to be kept for use. Lond. Pharmac. 1809.

MENTI LEVATOR, in *Anatomy*, a small muscle in the chin. It is described with the muscles of the lower lip, in the article DEGLUTITION.

MENTOLE, in *Geography*, a town of the island of Ceylon, on the west coast; 80 miles W.N.W. of Trincomaly. N. lat. $9^{\circ} 1'$. E. long. $80^{\circ} 3'$.

MENTON, a town of France, in the department of the Maritime Alps, and chief place of a canton, in the district of Monaco; 6 miles N.E. of Monaco. The place contains 3289, and the canton 4383 inhabitants, on a territory of 60 kilometres, in 4 communes.

MENTOS, a town of Louisiana, on the Akanfas; 150 miles S.W. of New Madrid. N. lat. $35^{\circ} 27'$. W. long. $92^{\circ} 40'$.

MENTUM, in *Anatomy*, the lower part of the face, beneath the mouth; which we otherwise distinguish by the name of *chin*.

MENTZ, or MAYENCE, *Archbishopric of*, in *Geography*, formerly an electoral principality of Germany, in which, besides corn, are breeds of cattle, fine garden fruits, and excellent wines, particularly those Rhenish wines that are furnished by the Rheingau; good salt is also manufactured here, and it has here and there iron mines. In the Mentz portion of the Berg-Strazza is found plenty of almonds, chestnuts, and fiberds. The lower part of the Eichsfeld yields corn in sufficient abundance, together with large quantities of flax and tobacco. The principal rivers are the Rhine, the Maine, the Jaxt, and the Lahn. In the whole

of the electoral countries of Mentz, comprehended within this circle, were 41 cities and 21 boroughs. Eichsfeld is now annexed to the kingdom of Westphalia. In the upper Eichsfeld are manufactures of serge and linen; and in the lower, tobacco and flax are cultivated. In the archbishopric are some woollen and other manufactures; and a considerable trade is carried on in wines. From Berg-Strazza are exported almonds, chestnuts, nuts, and nut-wood. The countries lying on the Rhine and on the Maine have, ever since the Reformation, been subject to the elector of Mentz, and maintained their attachment to the Roman Catholic faith. It was in the year 751 that the bishopric of Mentz was fully established as an archbishopric, which was first administered by S. Boniface; and with the archbishopric, the first in Germany, the dignity of elector was inseparably connected. In 1802, at the settlement of the indemnities, in consequence of the ascendancy gained by the French in Germany, all that part of the diocese which lay on the right of the Maine, was given to the prince of Nassau-Usingen, except the bailiwick of Aschaffenburg. It was then determined that the electoral title should from that time be elector of Aschaffenburg, and count of Wetzlar; that he should still continue arch-chancellor of the empire, and hold his office at Ratisbon, with some abbies, and other indemnities, so as to yield an annual revenue of a million of florins. His jurisdiction, as metropolitan of the German church, was to extend all over Germany, except the Prussian states.

MENTZ, or *Mayence*, formerly capital of the above-mentioned electorate and archbishopric of Germany, but by the treaty of Campo Formio, 1797, a city of France, chief place of a district, and capital of the department of Mont-Tonnerre, situated at the conflux of the Rhine and Maine; bearing in Latin the appellation of "Moguntium." It was considered as a barrier fortress of the empire. The city is large and populous, but consists, for the most part, of narrow streets and old-fashioned houses, intermixed with some fine buildings, a considerable palace, and a magnificent cathedral. Before the revolution, it contained seven parish churches, six monasteries, and five nunneries, with a charter-house and two other nunneries near the city, and also six hospitals. The university was founded by Charlemagne in 800, and established in 1482 by the archbishop Diether. It has undergone many revolutions, and frequently changed its masters, until in 1792 it was taken by the French; but in the following year it was retaken. By the peace between the emperor and the French it was surrendered to the latter, who took possession of it. The number of inhabitants is reckoned at 21,400, and those of its canton 21,615, in two communes. N. lat. $49^{\circ} 58'$. E. long. $8^{\circ} 14'$.

MENTZELIA, in *Botany*, named by Plumier in honour of Dr. Christian Mentzel, Counsellor and Physician to the Elector of Brandenburg, who published, in 1682, in folio, an Index of the names of plants in various languages, accompanied by a small catalogue of rare plants, with plates. He wrote also some papers in the Ephemerides Acad. Nat. Curios. on geological subjects, and died in 1701, aged 79. Plum. Gen. 40. Linn. Gen. 270. Schreb. 360. Willd. Sp. Pl. v. 2. 1175. Mart. Mill. Dict. v. 3. Jacq. Amer. 164. Ait. Hort. Kew. ed. 2. v. 3. 302. Juss. 321. Lamarck Illust. t. 425.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Onagraceæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, spreading, deciduous, of five, lanceolate, concave, pointed leaves. *Cor.* Petals five, obovate, pointed, spreading, a little longer than the calyx. *Stam.* Filaments numerous (about thirty), the length of the calyx, erect, the outer ones membranous in the upper part; others roundish. *Pist.* Germen inferior, cylindrical,

cylindrical, long; style thread-shaped, as long as the stamens; stigma simple, obtuse. *Peric.* Capsule cylindrical, long, of one cell, three-valved at top. *Seeds* about six, oblong, angulated.

Eff. Cl. Calyx of five leaves. Petals five. Capsule inferior, cylindrical, many-seeded.

1. *M. aspera*. Linn. Sp. Pl. 735. (*M. foliis et fructibus asperis*; Plum. Ic. 167. t. 174 f. 1.)—Stem branched. Flowers axillary. Petals notched, obtuse.—A native of South America, and the West Indies, very common among the bushes in all the dry savannahs about Kingston, Jamaica. It flowers in the gardens during July and August. *Root* annual. Whole herb clothed with rigid, partly hooked bristles. *Stem* round, branched, leafy. *Leaves* on longish stalks, oblong, somewhat hastate, acute, unequally and coarsely serrated. *Flowers* axillary, solitary, nearly sessile, yellow. The germen and calyx very bristly.

2. *M. hispida*. Willd. n. 2. (*M. aspera*; Cavan. Ic. v. 1. 51. t. 70.)—Stem forked. Flowers solitary, at the forks of the stem. Petals entire, acutely pointed.—A native of Mexico. This differs from the last in having the leaves more ovate, flowers principally from the forks of the stem, with a much shorter and ovate germen, and longer leaves of the calyx. Willdeow also points out the above difference of the petals.

This genus is very nearly allied in habit as well as character to *Loosa* (see that article); indeed so much are they alike, that we greatly suspect they must be one genus, for which *Mentzelia*, being the oldest name, ought to remain, and the other ambiguous appellation would be happily superseded.

MENU, in *Biography*, is the name of a very celebrated law-giver among the Hindoos. Sir William Jones translated his code from the original Sanscrit; and it is in the hands of the public, under the title of "Institutes of Hindoo Law, or the Ordinances of Menu." The work comprises, in 12 chapters and 2685 verses, the Indian system of duties, religious and civil, and is held in the greatest reverence by all classes of Hindoos; so much so, that should a series of Brahmans omit, for three generations, the reading of Menu, their sacerdotal class would, as they assert, be forfeited. They must, however, explain it only to their pupils of the three highest classes: and to ensure a greater degree of reverence for its sanctity, it is understood that a Brahman, duly pious, would not, on any consideration, read it on a forbidden day of the moon, or until after the performance of certain ceremonies prescribed in the code. The learned translator, from internal evidence, ascribes the date of the Institutes, in their present form, to a period so far back as 880 years before Christ. Whether Menu, or Menus in the nominative, and Menos in an oblique case, was the same personage with Minos, he leaves others to determine; but he evidently inclines to that opinion, though, with his characteristic modesty, he forbears any pointed expression of it. He recognises a strong resemblance, though obscured and faded by time, between the Menu of the Hindoos, with his divine bull, or the emblem of abstract justice, and the Mneues of Egypt, with his companion or symbol Apis: and though he duly guards himself and his readers against the delusions of etymological conjecture, he relates Minos and Mneues, or Mneuis, to be merely Greek terminations, and that the crude nouu is composed of the same radical letters in Greek and Sanscrit. "And if," he continues in his preface, "Minos, the son of Jupiter, whom the Cretans, from national vanity, might have made a native of their own island, was really the same person with Menu, the son of Brahma, we have the good fortune to restore, by means of

Indian literature, the most celebrated system of heathen jurisprudence." The fables of the Hindoos, as to the antiquity and origin of the laws of Menu, are in their usual style of extravagance. They firmly believe them to have been promulgated in the beginning of time by Menu, son or grandson of Brahma, or, in plain language, the first of created beings; and not the eldest only, but the host of legislators.

Menu is highly honoured by name in the Veda itself, where it is declared, that "whatever Menu pronounced was a medicine for the soul itself;" and it is asserted by a high authority among the Hindoos, "that Menu held the first rank among legislators, because he had expressed in his code the whole sense of the Veda; that no code was approved, which contradicted Menu; that other *astras*, and treatises on grammar or logic, retained splendour only so long as Menu, who taught the way to just wealth, to virtue, and to final happiness, was not seen in competition with them." It has been also authoritatively asserted, that "the Veda, with its *Angas*, or the six compositions deduced from it, the revealed system of medicine, the *Puranas*, or sacred histories, and the code of MENU, were four works of supreme authority, which ought never to be shaken by arguments merely human." It is the general opinion of the Pandits, that Brahma taught his laws to Menu in 100,000 verses, which Menu explained to the world in the very words of the book translated by Sir William Jones. It was afterwards abridged to 12,000 verses, and subsequently to 4000; but at present they consist only of 2685 verses. Of the numerous glosses or comments on Menu, that of Cullucá Bhatta is most highly commended by Sir William Jones, who has implicitly followed his text and interpretation.

The work, as presented to the European reader by Sir William Jones, contains abundance of curious matter, extremely interesting both to speculative lawyers and to antiquaries; with many beauties, and with many blemishes, which cannot be justified or palliated. It is a system of despotism and priestcraft, both indeed limited by law, but artfully conspiring to give mutual support, though with mutual checks: it abounds with strange conceits in metaphysics and natural philosophy, with idle superstitions, and with a scheme of theology most obscurely figurative, and consequently liable to dangerous misconceptions; with minute and childish formalities; with ceremonies generally absurd, and often ridiculous. The punishments denounced are partial and fanciful; for some crimes dreadfully cruel, for others reprehensibly slight: and the morals even, though rigid enough on the whole, are, in one or two instances, (as in the case of light oaths and of pious perjury,) unaccountably relaxed. Nevertheless, a spirit of sublime devotion, of benevolence to mankind, and of amiable tenderness to all sentient creatures, pervades the whole work. Some doubt, however, has been entertained with regard to the sublimity of the devotion, and the amiable tenderness of feeling, ascribed by Sir William Jones to this specimen of the Hindoo writings; and it has been alleged, that the general character of the devotion of the Hindoos is that of a debasing superstition, and that their tenderness for animals is chiefly superstition and weakness, derived from their doctrine of transmigration. The style of it has a certain austere majesty that sounds like the language of legislation, and extorts a respectful awe. The sentiments of independence on all beings but God, and the harsh admonitions, even to kings, are truly noble. Whatever opinion, in short, may be formed of Menu and his laws, in a country happily enlightened by sound philosophy and the only true revelation, it ought to be remembered that those laws are actually revered as the

word of the Most High, by nations of great importance to the political and commercial interests of Europe, and particularly by many millions of Hindoo subjects, whose well directed industry adds largely to the wealth of Britain, and who ask no more in return than protection for their persons and places of abode, justice in their temporal concerns, indulgence to the prejudices of their old religion, and the benefit of those laws which they have been taught to believe sacred, and which alone they can possibly comprehend. See Preface to Sir William Jones's translation of the "Institutes of Menu," in his Works, vol. vii. p. 75, &c. 8vo. (See GENTOO.) For an extended account of its incomparable translator, see our article JONES, Sir WILLIAM.

The Hindoos have, however, seven holy persons distinguished by the common denomination of Menu, whose names we shall presently give; but the first and last only demand any particular notice. The name is derived from the Sanscrit root *men*, or *man*, to understand or think; and it signifies, as all the Pandits agree, *intelligent*, particularly in the doctrines of the Veda, or a thinking being: hence *menes*, *mens*, and *mind*, also *man*, both in Gothic and English. If in the first Menu we recognise Adam, our great progenitor; so in the seventh we find Noah, the great restorer of our species. Here follow their names: 1. Swayambhuva, meaning the son of the Self-existent; a name applied by different sects to the peculiar object of their adoration. 2. Swarochesha. 3. Uttama. 4. Tamasa. 5. Raivata. 6. Chakusha. 7. Satyavrata. In the time of the last, the general deluge occurred. See MATSYAVATARA and ILA, also SWAYAMBHUVA and SATYAVRATA.

Although seven Menus are usually referred to in Hindoo books, that precise number is not always given. In the tenth lecture of the Gita, (see MAHABARAT,) "the four Menus" are mentioned; and fourteen are spoken of in the Siva-purana. It seems, indeed, a generic term for *wisdom*. Mr. Wilford (As. Res. vol. v.) thinks it likely that the seven Menus, the seven Brahmadicas, and the seven Rishis, (see RISHI,) are the same, and make only so many individuals, first called Brahmadicas, or children of Brahma, created for the purpose of supplying the world with inhabitants. Having fulfilled this mission, they became sovereigns, or Menus, who, when far advanced in years, withdrew from the world to solitary places to prepare for death; as, according to the Puranas, was the general practice of mankind in the early ages; and became Rishis, or holy penitents, who, by their salutary counsels and the example of their austerities, pointed out the paths of virtue and rectitude to mankind. There are still much confusion and contradiction in the accounts of the person and characters of these holy persons, of whom many particulars occur in Moor's Hindoo Pantheon.

MENUET, Fr., MINUET, Engl., the name of a musical movement in triple time of three crotchets or three quavers in a bar, which is the guide to a graceful dance in the slowest time of any movement that is danced off the stage at public or private balls, since the *louvre* has totally lost its favour.

The minuet, according to Brossard, had its origin in Poitou. The melody of the minuet is usually divided into two parts, or strains, consisting of eight bars each, of which the first ends on the fifth of the key, and the second on the key note.

There is so much dignity and grace in this dance, that it is to be lamented it has ceased to be a part of education, and to be discontinued at private balls and assemblies where elegance and decorum used to be observed. In learning the steps and figure of the minuet, other things necessary in

polished society used to be taught; such as the bow, the curtsy, the entrance into a room and departure from it with ease and grace, the presenting to or receiving from a superior; indeed the whole carriage of the person used to be regulated in learning the minuet, in a manner not, as we can discover, included in the Scotch step or Irish lilt, the cotillon, or the waltz. Those who never had the courage or intention to exhibit their persons in a ball-room, public or private, have been discovered to have learned to dance by standing still or walking in the street, as a peasant discovers himself to have been drilled in the same situations.

MENUF, or MENOUF, in *Geography*, a town of Egypt, and chief place of a district, seated near a canal, which was formerly navigable, but has ceased to be so in consequence of a dyke raised for restraining the inundations of the Nile in that branch of it which runs to Damietta. The canal surrounds the walls of the town from S. to W. The houses are mean and the streets narrow and crooked; nor has it many remains of antiquity. In its vicinity are no gardens, so that it is supplied with fruit and vegetables from a distance; but the land is well cultivated and produces wheat, barley, maize, lentils and lupines. The cultivation of maize from seed-time to harvest occupies 70 or 80 days. The animals employed in husbandry are oxen, buffaloes, camels, asses, and a few horses. Menuf, during the inundation, is surrounded with water, but it does not long continue. It is sheltered from the S., and being open to the N. and N.W., it is kept moderately cool. The number of inhabitants is about 5000; 22 miles N.N.W. of Cairo.

MENUFIE, or MENOUFIE, the district of which Menuf is the capital, on the S. part of the Delta, between the E. and W. branches of the Nile.

MENUGAT, a town of Asiatic Turkey, in the province of Caramania, on a river of the same name, which runs into the gulf of Satalia; 21 miles W. of Alanieh.

MENYANTHES, in *Botany*, according to Linnæus, is derived from *μην*, a month, and *ανθος*, a flower, because the plant continues in blossom about that period of time. *M. trifoliata* is undoubtedly the *μινυανθεις* of Theophrastus and *Minyanthes* of Pliny, because those authors describe it as having ternate leaves and ornamental flowers. Buckbean. Linn. Gen. 82. Schreb. 107. Willd. Sp. Pl. v. 1. 810. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 225. Prod. Fl. Græc. p. 1. 128. Ait. Hort. Kew. ed. 2. v. 1. 312. Tournef. t. 15. Juss. 98. Lamarck Illustr. t. 100. Gærtn. t. 114. Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Precie*, Linn. *Lysimachie*, Juss. *Gentiane*, Ventenat.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, five-cleft, erect, permanent. *Cor.* of one petal, funnel-shaped; tube cylindrically funnel-shaped, short; limb cloven below the middle into five, spreading, recurved, obtuse, more or less hairy segments. *Stam.* Filaments five, awl-shaped, short; anthers acute, cloven at the base, erect. *Pist.* Germen superior, conical; style cylindrical, exactly as long as the corolla; stigma cloven, compressed. *Peric.* Capsule ovate, enveloped by the calyx, of one cell. *Seeds* numerous, ovate, small.

Ess. Ch. Corolla hairy. Stigma cloven. Capsule of one cell.

1. *M. nymphæoides*. Fringed Buckbean. Lesser Yellow Water Lily. Linn. Sp. Pl. 207. Engl. Bot. t. 217. Fl. Dan. t. 339.—Leaves heart shaped, entire, waved. Corolla ciliated. Found occasionally in rivers and lakes, though by no means so common a plant with us as in the still canals of Holland. It flowers from June to August. *Root* perennial, long and stringy. *Stems* very long, round, bearing leaves and flowers towards their summits. *Leaves* opposite, simple,

simple, on stalks, floating, heart-shaped or roundish, wavy, smooth. *Flowers* axillary, crowded together, on stalks, expanding at noon, of a golden colour, fringed at the margin. Dr. Smith observes, that the leaves of this plant, like those of the *Nymphaea*, perspire so quickly as to become dry in a few hours, though at first so succulent. Some authors have thought from the corolla being ciliated, not hairy, that *M. nymphaeoides* should be referred to another genus. But as Justien, whose authority upon such a point is very great, has not separated this from *M. trifoliata*, and as *M. indica* and *ovata* seem to connect the two, we think with Dr. Smith they may safely remain as they are.

2. *M. ovata*. Oval-leaved Buckbean. Linn. Suppl. 133. Willd. n. 2. (*M. capensis*; Thunb. Prod. 34. Villaria *ovata*; Vent. Choix de Plantes, t. 9.)—Leaves ovate, on long stalks. Stem panicled. An aquatic of the Cape, flowering in May and June. Linnæus observes that this species has the habit of an *Alisma*, but the flower of a *Menyanthes*. Root fibrous. Stems few, about two feet high and the thickness of a quill, straight, cylindrical, sometimes naked and like straws, more frequently furnished with three or four leaves, simple, smooth, bright green. Leaves obtuse, generally quite entire, nerved, smooth, of a bright green colour and bitter flavour. Flowers on stalks, bracted, of a fine yellow or citron colour, without smell.

3. *M. indica*. Indian Buckbean. Linn. Sp. Pl. 207. Bot. Mag. t. 658.—Leaves heart-shaped, somewhat notched. Flowers on simple stalks. Corolla internally hairy. Native of the Cape, flowering nearly through the summer. Root fibrous. Stems floating, branched. Leaves peltate, bright green on one side, dark russet on the other. Flowers forming a lax umbel, placed on the stem just below the leaf, of a bright yellow colour, looking as if covered with silver froth.

4. *M. cristata*. Crested Buckbean, or Antara-Jamara of the Telingas. Roxb. Coromandel. v. 3. t. 105.—Leaves heart-shaped, wavy. Flowers on simple stalks. Corolla with an elevated crested rib.—A native of banks, or pools of fresh water, in the East Indies, where it floats, often not reaching the bottom with its roots. Flowering time the wet and cold season.—Roots annual, fibrous. Stems numerous, much spreading. Leaves on short stalks, smooth; green above with a purplish tinge. Flowers in a loose umbel, not hairy, of a pure white colour, about an inch in diameter. Rheede describes the last species as having ten stamens. We suspect the present, which has also ten, though five are imperfect, is what sir William Jones described in his select Indian plants, calling it *Cumuda*, or deluge of the water, which seems to be a general name for beautiful aquatic flowers.

5. *M. exaltata*. Tall Buckbean. Soland. MSS. and Herb. Banks. Ait. Hort. Kew. ed. 2. v. 1. 312. Bot. Mag. t. 1029.—Leaves roundish-heart-shaped, somewhat peltate, slightly crenate. Stem panicled. A native of New South Wales, where it was discovered by sir Joseph Banks. It flowers from November to February, being kept in a cistern near the glass in a bark-stove. This is a larger plant than any of the preceding, with a tall, panicled, many-flowered stem. The leaves are heart-shaped, veiny and wavy. Flowers deep yellow, their petals toothed at the edge, and bearded on the upper side at the base. Dr. Sims remarks that it is nearly allied to *M. ovata*, and should immediately precede that species.

6. *M. trifoliata*. Common Buckbean, or Marsh Trefoil. Linn. Sp. Pl. 208. Engl. Bot. t. 495. Curt. Lond. fasc. 4. t. 17.—Leaves ternate. Corolla extremely hairy on the upper side. This elegant plant is common in boggy, marshy

situations, and flowers in June or July. Root perennial, formed of spreading scyons, black. Stem leafy, spreading horizontally, branched. Leaves ternate, on stalks, toothed and slightly folded at the edge. Flowers in spikes, bracted, on stalks, of a beautiful flesh-colour, hairy and very thickly set on the upper side with fleshy obtuse fibres. Style prominent. The whole herb is bitter, powerfully inducing perspiration. Dr. Smith remarks that "an infusion of it was long ago recommended for the rheumatism, and has been a popular medicine in England. It has also been given for the gout, scurvy, ague, catarrh and dropsy, a formidable list of disorders: if it has any right to such celebrity, it must act as a powerful tonic."

7. *M. hydrophyllum*. Water-leaf Buckbean. Loureir. Cochine. 105. Mart. Mill. Dict. v. 3.—Leaves heart-shaped, entire. Flowers axillary, crowded together. A native of swamps in Cochinchina. This plant is considered by the authors above quoted as forming a connecting link between *Menyanthes* and *Hydrophyllum*. The stem is thread-shaped and creeping. Leaves smooth, on stalks, scattered, few in number. Flowers white, on long stalks.

MENYANTHES Trifoliata, Water-trefoil, or Buck-bean, in the *Materia Medica*. The whole plant is so extremely bitter, that in some countries it is used for hops in the preparation of malt-liquor; and yet Linnæus observes, that the poorer people in Lapland make a bread of the powdered roots mixed with meal, acknowledging at the same time that it is a very unpalatable food. The blackness manifested by adding a solution of green vitriol to the juice, or to a strong infusion of the leaves of buckbean, is a sufficient test of its astringency; while a drachm of the powdered leaves seldom fails to open the body, or produce vomiting; so that in common with the tonic properties of a bitter, it seems farther to possess a considerable share of medicinal activity: we can therefore more easily credit the reports of its success in a great number of chronic diseases mentioned by various authors, as scurvy, dropsy, jaundice, asthma, periodical headaches, intermittents, hypochondriasis, cachexia, obstructions of the meninges, rheumatism, scrophula, worms, gout. Dr. Boerhaave was relieved in the last mentioned complaint by drinking the juice mixed with whey; and Dr. Alston tells us, that "this plant had remarkable effects in the gout, in keeping off 'the paroxysms;' but adds, "though not to the patient's advantage."

In confirmation of the good effects of water trefoil in dropsies, we are told that sheep, when forced to eat it, are cured of the rot (*oves tabidæ*); yet as we have but few and imperfect proofs of its diuretic powers, this fact will be considered of little weight.

Bergius confines the uses of this plant to scorbutus, leucophlegmatia, arthritis, rheumatismus, cacochætes, and this specification is still farther contracted by later writers on the materia medica. In Lewis's Mat. Med. (by Mr. Aikin) it is said, that the leaves of buckbean "have of late years come into common use as an alterative and aperient, in impurities of the humours, and some hydropic and rheumatic cases;" and as an active and eccoprotic bitter, we should suppose them not ill adapted to supply the want of bile in the *primæ viæ*, and thus infer their use in protracted jaundice, and other biliary obstructions. Dr. Cullen has "had several instances of their good effects in some cutaneous diseases of the herpetic and seemingly cancerous kind."

The leaves may be given in powder from ℞i to ℞ij for a dose two or three times a day, but a strong infusion of them is perhaps preferable, and with delicate stomachs it may be necessary to conjoin a grateful aromatic: they impart their properties both to watery and spirituous menstrua, and an extract

extract is ordered to be prepared from them in the Ph. Dan. p. 171. "Efficax et frequentis commodique usus." Murray. Lewis Mat. Med. Cullen Mat. Med. Woodville Med. Bot.

MENZABANO, in *Geography*, a town of Italy, on the river Mincio, famous for a battle fought here between the French and the Austrians, on the 28th of December 1801, in which, after a very obstinate and sanguinary contest, the former were victorious, and took 8000 prisoners.

MENZALE, called by Strabo (lib. xvii.) and the Arabian authors *Tanis* (which see), a large lake, separated from the Mediterranean, to which it is parallel, by a slip of land, about 60 miles in length and from 2 to 12 in breadth; filled and occasionally overflowed by the waters of the Nile. During the inundation the water is fresh, and becomes salt as the river returns into its bed; a circumstance which was observed in the time of the caliphs. The Nile, says the geographer of Nubia, overflowing its banks at the summer solstice, the canals which discharge themselves into lake Tanis, render its waters fresh; and the sea, flowing into it, in its turn, makes them salt. In this lake are islands with buildings in them like barns; but they are only accessible in boats. About 1200 boats, each of which pays annually 40 livres to the Pacha's renter, are constantly employed in fishing on the lake. The quality of the water gives to the fish a white flesh and a fine delicate flavour. They supply Damietta at a cheap rate. As the lake has several communications with the Nile and the Mediterranean, and being full of islands, reeds, herbs, and insects, it is abundantly stocked with fish. Two thousand persons are annually employed in the fishery, and thousands of birds constantly feed upon the fish without occasioning any perceptible diminution. The waters are covered with wild geese, ducks, teals, plovers, and ibises; and various other birds of large size and beautiful plumage. The islands in this lake are for the most part uninhabited, except Matarieh; and of course are uncultivated. Menzalé communicates with the sea by two mouths, *viz.* Dibé and Eumené Fareggi, which are the Mendesian and Tanitic mouths of the ancients; each mouth is shut towards the sea with a bar or bank, forming the part of a circle. The tongue of land, separating the lake from the sea, extends, with only four interruptions in its whole length, from Damietta to Tineh. The length of the lake from N.W. to S.E. is 43,000 fathoms, and its breadth from 12,000 to 26,000.—Also, a town of Egypt, situated near the lake to which it gives name; 20 miles S.S.E. of Damietta. N. lat. $31^{\circ} 3'$. E. long. 32° .

MENZALINSK, a town of Russia, in the government of Upha; 132 miles W.N.W. of Upha. N. lat. $55^{\circ} 16'$. E. long. $52^{\circ} 14'$.

MENZIESIA, in *Botany*, so named many years ago, by the writer of this, in the *Plantarum Icones ex Herb. Linn. fasc. 3*, in honour of his much-valued friend Mr. Archibald Menzies, F. L. S. This gentleman, in his voyage round the world with captain Vancouver, collected many rare and non-descript plants, particularly on the western coasts of New Holland and of North America. He also discovered, near Dusky bay in New Zealand, the richest collection of *Jungermannia* that was ever, perhaps, made by any one person.—Sm. Plant. Ic. 56. Willd. Sp. Pl. v. 2. 355. Michaux Boreal-Amer. v. 1. 235. Juss. in Annal. du Mus. v. 1. 55. Ait. Hort. Kew. ed. 2. v. 2. 360. Swartz Tr. of Linn. Soc. v. 10. 375. Engl. Bot. v. 35. 2469. Lamarck Dict. v. 4. 115. Illustr. t. 285. Class and order, *Obandria Monogynia*. Nat. Ord. *Bicornes*, Linn. *Rhododendra*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, more or

less deeply four or five-cleft, permanent. *Cor.* of one petal, inflated, nearly ovate, deciduous; its limb spreading, in four or five small, spreading, equal segments. *Stam.* Filaments eight or ten, thread-shaped, equal, shorter than the corolla, inserted into the receptacle; anthers erect, oblong, simple, two-lobed at the base, opening by two pores at the top. *Pist.* Germen superior, roundish-oblong, furrowed; style angular, erect, rather longer than the filaments; stigma obtuse, with four or five small lobes. *Peric.* Capsules elliptic-oblong, with four or five furrows, and as many valves and cells, opening from the top downward, the partitions double, formed of the inflexed margins of the valves. *Seeds* numerous, small, oblong, more or less pointed, affixed to the ribs of the large central column.

Ess. Ch. Calyx of one leaf, four or five-cleft. Corolla of one petal, inflated. Filaments inserted into the receptacle. Capsule superior, of four or five cells, the partitions from the inflexed margins of the valves.

1. *M. ferruginea*. Rusty-flowered Menziesia. Sm. Plant. Ic. t. 56.—Calyx very slightly four-lobed. Leaves obovato-lanceolate, finely serrated; smooth beneath.—Gathered by Mr. Menzies, very copiously, in 1787 and 1788, on the west coast of North America. The stem is shrubby, two or three feet high, determinately branched, spreading, round, smooth, the pale bark scaling off in long strips; branches leafy, hairy when young, springing from the same buds as the flowers, the scales composing which are ovate and fringed. Leaves alternate, crowded towards the tops of the branches, stalked, spreading, obovate, inclining to lanceolate, one and a half or two inches long, three-fourths of an inch broad, obtuse, tipped with a gland, finely serrated, fringed, membranous, flat, veiny; green and besprinkled with white depressed hairs above; pale and smooth beneath, except a few hairs, or flat narrow scales, on the ribs; deciduous. Footstalks short, winged. Stipules none. Flowers from the buds of the last season, five or more together, on simple stalks, about an inch long, covered with viscid hairs, and drooping. Calyx small and flat, very slightly four-lobed, or rather waved at the edge, fringed. Corolla ovate, one-third of an inch long, the border four-cleft, slightly expanded, altogether (as appears by Mr. Menzies's drawing and description) of a rusty hue. Stamens eight. Capsule smooth, dark brown externally, pale within.

2. *M. globularis*. Pale-flowered Menziesia. Salisb. Parad. t. 44. Ait. Hort. Kew. n. 1. (*M. Smithii*; Michaux Boreal-Amer. v. 1. 235.)—Calyx in four rounded lobes. Leaves obovate, nearly entire; glaucous and downy beneath.—Native of South Carolina, according to Salisbury and Lyon. Of this we know nothing but from the works quoted, by which it appears to differ from the foregoing, besides the above specific characters, in having a more globose corolla, pale yellow with red streaks. The flowers are octandrous and four-cleft, as in *M. ferruginea*. Michaux mistook this for the original species; and having no information of the specific name, gave one of his own. The above writers copy his error of the press.

3. *M. polifolia*. Irish Menziesia. Juss. in Ann. du Mus. v. 1. 55. Ait. n. 2. (*Erica Daboecii*; Sm. Fl. Brit. 420. Engl. Bot. t. 35. Willd. Sp. Pl. v. 2. 383. *Andromeda Daboecia*; Linn. Syst. Veg. ed. 13. 338.)—Calyx in four deep segments. Flowers racemose. Leaves ovate; very densely downy and snow-white beneath.—Native of hills in Spain and Ireland, on a boggy soil. Mr. Lambert found it abundant on Croagh Patrick in the county of Mayo, and Dr. Wade in the district of Cunnemara, county of Galway. In gardens it is often cultivated for ornament, amongst American and other flowering shrubs which thrive in bog earth,

earth, flowering from June to September. The *stems* are shrubby, bushy, a foot and a half high, with many upright, simple, leafy branches, at length decumbent and spreading. *Leaves* numerous, stalked, generally alternate, now and then opposite, or three together, ovate, entire, slightly revolute; dark green, shining, and somewhat hairy above; snow-white, with dense cottony down beneath, their smooth red rib vanishing about the middle. There are axillary tufts of numerous small leaves besides. *Flowers* four-cleft, octandrous, large, purplish-red, ovate, with four obtuse angles, drooping in a long, loose, inclining, bracteated cluster; the stalks and calyx red, hairy, and viscid. *Capsule* small and roundish, with partitions from the inflexed margin of the valves, which is never the case with a real *Andromeda*. Hence this plant was retained in *Erica* in Fl. Brit. according to the original opinion of Linnæus, who was chiefly led by number in the parts of fructification. M. de Jussieu however, who always much approved this genus of *Menziesia*, has reinforced it with the present species, as Dr. Swartz has done with the two following.

4. *M. cerulea*. Scottish *Menziesia*. Swartz Tr. of Linn. Soc. v. 10. 377. t. 30. f. A. Engl. Bot. t. 2469. (*Andromeda cærulea*; Linn. Sp. Pl. 563. Fl. Lapp. ed. 2. 133. t. 1. f. 5. Lapl. Tour. v. 1. 272. Fl. Dan. t. 57. A. *taxifolia*; Pall. Ross. v. 1. p. 2. 54. t. 72. f. 2. *Erica cærulea*; Willd. Sp. Pl. v. 2. 393.)—Calyx in five deep acute segments. Corolla ovate. Flower-stalks terminal, aggregate, simple. Leaves scattered, numerous, linear, obtuse, finely serrated.—Native of turfy stony mountainous heaths in Lapland, Norway, some part of Siberia, and also in the most northern parts of America. It has lately been discovered at Avienore in Strathspey, as well as in the remote western isles of Shiant. This is a more humble *shrub* than the last, with the habit of an *Empetrum*, and distinguished from all the foregoing species, by its narrow crowded *leaves*, like those of a heath, moderately spreading in every direction. They are almost linear, about half an inch long, rather shining above, finely toothed at the edge: their rib downy underneath. *Flower-stalks* four or five at the top of some of the branches, at first perfectly terminal, but the branch gradually shoots beyond them; each is about an inch and a half long, simple, rough with red glandular hairs, drooping gracefully at the top, and bearing one large ovate *flower* of a pale blueish or livid red; the *calyx* in five deep acute segments. On turning to Pallas's *Flora Rossica*, we find he did not alter the specific name to *taxifolia*, from want of understanding the true meaning of *cerulea*, but because the *corolla* occasionally varies to flesh-colour or to white; but these changes are frequent, and do not authorize such a measure.

5. *M. empetriformis*. Bell-flowered *Menziesia*. Sm. Tr. of Linn. Soc. v. 10. 380.—Calyx in five deep obtuse segments. Corolla bell-shaped. Flower-stalks terminal, aggregate, simple. Leaves scattered, linear, obtuse, finely serrated; concave beneath.—Gathered by Mr. Menzies on the west coast of North America, near Nootka Sound. A much taller plant than the last, with less crowded *leaves*, which are concave beneath, with a smooth rib; their upper surface shining; the margin fringed with bristly serratures. The *flower-stalks* are crowded in like manner about the tops of the branches, but in greater number. *Calyx* not above half so long, with five blunt, thin-edged, deep, convex segments. *Corolla* smaller, bell-shaped, with five spreading, ovate, marginal segments, and not contracted at the mouth. *Capsule* almost globular, dark brown, besprinkled with resinous dots.

6. *M. bryantia*. Mossy *Menziesia*. Swartz Tr. of Linn. Soc. v. 10. 378. t. 30. f. B. (*Andromeda bryantha*; Linn.

Mant. 238. A. *Bryanthus*; Pall. Ross. v. 1. p. 2. 57. t. 73. f. 1. *Bryanthus*; Gmel. Sib. v. 4. 133. t. 57. f. 3. *Erica bryantha*; Willd. Sp. Pl. v. 2. 386.)—Calyx in four deep acute segments. Corolla bell-shaped, in four deep segments. Flower-stalks terminal, corymbose. Leaves scattered, elliptic-oblong, toothed; convex beneath.—Gathered by Steller, on mossy rocks in Kamtschatka, flowering in July. This elegant little *shrub* is much smaller than any of the rest, clothing the ground with its long trailing branching *stems*; and the small, oblong, numerous *leaves* give it a moss-like aspect. The *flowers* grow four or five together in a small, corymbose, bracteated cluster, on a long terminal stalk. The *calyx* and *stamens* are red. *Corolla* white, divided below the middle into four segments. Pallas says it has sometimes five or six divisions, and that the *stamens* are equal to them in number; but he must mean that they are twice as numerous, which indeed his figure expresses, and which is the case in the whole genus. The *capsule* is nearly globular, with four furrows. We have seen no specimen.

These are all the species of *Menziesia* hitherto established. Willdenow suggests, Sp. Pl. v. 2. 610, that the *Andromeda odandra*, Swartz Ind. Occ. 840, may belong to this genus; but Swartz describes the corolla as permanent, and though he does not describe the fruit, in a manner to assist us in this enquiry, we must presume he did not overlook this plant of his own, while seeking for *Menziesia* amongst *Andromeda*.

MENZIL, in *Geography*, a town of Africa, in the kingdom of Tunis, anciently called "Zæta;" 4 miles S.S.W. of Sufa.

MENZINI, BENEDETTO, in *Biography*, an eminent Italian poet, was born at Florence of indigent parents in 1646. He was taken at an early period into the house of Gianvincenzo Salviati, who gave him the means of cultivating his talents. He was soon distinguished for eloquence, and opened a school of rhetoric. By the advice of the celebrated Redi he turned his efforts to Italian poetry, and in 1674 published a volume of poems, dedicated to the grand duke Cosmo III., and in 1679 he published a treatise, entitled "Costruzione irregolare della Lingua Toscana," and in the following year he appeared before the public with a volume of lyric poems, by which he obtained great reputation. In 1685 he accepted an invitation from queen Christina of Sweden, then resident at Rome, who gave him a very favourable reception, and admitted him into her academy. He had now leisure to pursue his studies, but the death of the queen in 1689 obliged him to seek a maintenance by writing for other persons, particularly sermons for the clergy who were unable to compose their own discourses. He at length received from pope Innocent XII. an office in the church of St. Angelo, in Peschiera; and in 1701 he was nominated coadjutor in the chair of eloquence at the college of the Sapienza at Rome. He died, according to one account, in 1704, but according to another in 1708. He wrote almost every kind of Italian poetry, but in anacreontic songs, in pastoral sonnets, elegies, and sacred hymns, he has few equals, and perhaps no superior; and in Italian satires none can compare with him. All the works of Menzini were collected and published at Florence, in four volumes, in the year 1731. Of these the first contains his lyric poems: the second his miscellaneous pieces: the third his Italian prose; and the fourth his Latin compositions. He was a member of the academy Della Crusca, and his works have been considered as belonging to the golden age of the language.

MEOLA, in *Geography*, a town of Italy, in the Trevisan; 11 miles E. of Treviso.

MEPHITIS, or MEPHITICAL *Exhalation*, denotes a poisonous

poisonous and noxious steam issuing out of the earth. See DAMP, *Mephitic Air*, and AZOTE. See also EFFLUVIA, and GROTTO *del Cani*.

MEPHITIS, in *Mythology*, is a name given to Juno, because she is supposed to preside over stinking exhalations, or corrupted and noxious air; and hence it was used to signify such noxious air itself. Servius, upon the passage in Virgil (*Æn.* vii) "Sævamque exhalat opaca Mephitim," says, that this goddess may possibly be Juno taken for the air, because it is by means of the air that bad smells are communicated. According to Scaliger, the word is Etruscan, and derived from the Syrians, with whom it signified any stinking smell. Juno had a temple among the Hirpines under this appellation.

MEPPEL, in *Geography*, a town of Holland, in the department of Overissel, seated on the Walt Aa; 24 miles W. of Covorden.

MEPPEN, a town and fortress of Germany, in the bishopric of Munster, at the conflux of the Hase and Embs; 52 miles N. of Munster. N. lat. 52° 43'. E. long. 7° 26'.

MEQUINENZA, a town of Spain, in the kingdom of Aragon, at the conflux of the Segre, the Cinea, and the Ebro; anciently called "Ostogesa" and "Istosa;" defended by a castle, and once the see of a bishop; 16 miles S.S.W. of Lerida.

MEQUINEZ, an imperial city of Morocco, greatly embellished and enlarged by Muley Ishmael, and the metropolis of the north. It is situated at the extremity of Beni-Hassen, 80 leagues N. of Morocco, and 20 leagues E. of Sallee and the sea. Maknassa, the founder of this city, built it at the bottom of a valley, but Muley Ishmael made it much larger, by building on the plain to the west. The city is surrounded by vallies and eminences highly cultivated, ornamented with gardens, and plantations of olive-trees, and watered by a variety of streams, so that the fruits and vegetables are of an excellent flavour. The winter is disagreeable on account of the quantity of mud which then accumulates in the city and its environs, because the streets are not paved, and the soil is clay. Mequinez is encompassed with walls: and the palace is fortified with two bastions, in which was formerly some small artillery. The Brebes have often conspired against the tyranny of its rulers; and on the western side are still seen some walls of circumvallation, six feet in height, which were probably only intrenchments for the infantry, as the attacks of the Brebes were sudden and momentary incursions, which did not require any long defence. In Mequinez, as well as in Morocco, there is a quarter walled in and guarded for the Jews. The houses are handsomer here than in that of Morocco; the Jews are more numerous, and derive greater profit from their industry, because the Moors of Mequinez are richer, and as they are nearer, they have greater intercourse with Europe than those of the Southern provinces. Contiguous to the quarter of the Jews, is another, inclosed with walls, but now in ruins, called the Negro town, built by Muley Ishmael for the families of his black soldiers; but of this the walls only remain. At the extremity of the city, on the S.E. side, is the emperor's palace, which is a very extensive building, including several gardens, well laid out and watered by abundant streams. In the centre is a large garden, surrounded by a spacious gallery supported by columns, which maintains a communication between the apartments. Those of the women are large, and terminate in a common chamber, built on a causeway that divides the great garden, where the women may look out at the window through an iron lattice. In passing from one apartment to another, we meet at intervals with regular courts, paved with squares of black and

white marble. In the middle of these courts is a marble basin, on which is raised a round shell; in the centre of this is a fountain that plays into the basin. There are many other fountains that supply water for the numerous ablutions of the Mahometans. At Mequinez, as well as at Fez, they make a kind of glazed tiles, similar to what we call Dutch tiles, of various colours; which are used to pave their rooms and face their walls, and give to their houses an air of neatness and coolness, not occurring in other towns of the empire. The Moors of Mequinez are much more affable and engaging than those of the southern provinces; and the women are extremely handsome, being very fair, with fine black eyes, and beautiful teeth. They are sometimes seen walking on the terrace; but when a Moor appears, they immediately retire. At Mequinez, as well as at Morocco, there is a hospital, or convent, of Spanish Recollects, founded more than 100 years ago by the munificence of the kings of Spain, for the benefit and spiritual comfort of the Christian captives. These convents are much respected in the country, both for the exemplary lives of the fathers, and the service they render to the poor, whom they supply with medicines gratis; 35 miles S.W. of Fez. N. lat. 33° 56'. W. long. 5° 50'.

MER, a town of France, in the department of the Loir and Cher, and chief place of a canton, in the district of Blois; 9 miles N.E. of Blois. The place contains 4300, and the canton 10,623 inhabitants, on a territory of 172½ kilometres, in 12 communes. N. lat. 47° 42'. E. long. 1° 35'.

MER.—*Oyster le Mer*. See OUSTER.

MERA, in *Geography*, a town of Spain, in Galicia, near the sea-coast; 3 miles E. of Corunna.

MERA, in *Hindoo Mythology*, is the fabled wife of Haimavat and mother of Uma, a name and form of Parvati, thus incarnated to become the wife of Siva, and parent, or reputed parent, of Kartikya. (See KARTIKYA.) The stories connected with this fable are very numerous, filling many books in great esteem among the Hindoos. In the thirtieth and following sections of the first kanda, or book, of the Ramayana, it is detailed in a very poetical style how the "great Haimavat, sovereign of mountains, the grand magazine of metallic substances, had two daughters of incomparable beauty, by his wife Mera." Their names were Ganga and Uma. The first (the river Ganges) was yielded in marriage to all the celestials, at their earnest solicitation. Her younger sister, remaining a virgin, became a devotee of extraordinary rigidity, and was at length espoused by Siva, whose frigidity was, however, such as to require much address, on the part of the celestials, to animate him to the due pitch of passion; his nuptials and the consequent production of Kartikya being of great moment. On this occasion it was that Kama, the god of love, artfully placing the beautiful Uma before Siva, while in the graceful act of gathering flowers wherewith to decorate his emblem, the Linga had the audacity to launch an arrow at the dreaded deity. Siva, enraged, reduced Kama to ashes (or, according to some legends, to a mental essence) by a beam of fire, darted from his central eye. This fable is noticed in the article KAMA, and is as often alluded to in Hindoo books as any perhaps in the whole range of their mythological extravagance. In the Siva-purana, the parents of Parvati in this incarnation are named Himachala and Mahina, in other works Himalaya and Mena. (See MENA.) The name of the father, in all cases, being derived from a Sanscrit word meaning snow. Mera is said to be daughter of the mountain Meru; a most fruitful source of mythological tales of wonder and extravagance. See MERU.

MERAB,

MERAB, in *Geography*, a town of Arabia, in the province of Nedjed; 100 miles N. of Yamama.

—Also, a town of Persia, in Khorasan; 45 miles N.E. of Meshed.

MERACOBIN, a town of Africa, in the kingdom of Adel, on the coast of the Indian sea. N. lat. 8° 10'. E. long. 49° 14'.

MERAN, a town of the Tyrol, of which it was formerly the capital, at the conflux of the Adige and Passer, containing six churches and convents; two miles S.S.E. of Tyrol. N. lat. 46° 38'. E. long. 11° 24'.

MERAT, a town of Hindoostan, in the country of Delhi; 40 miles N. of Delhi. N. lat. 29° 20'. E. long. 78° 6'.

MERATE, a town of Italy, in the department of the Serio; 9 miles W. of Bergamo.

MERATTE, a town of Algiers; 15 miles N. of Tagademt.

MERAUDABAD, or MOORADABAD, a town of Hindoostan, in Oude, once large with a mint, but now decayed; 20 miles N.E. of Sumbul.

MERBAT, a town of Arabia, in the province of Hadramaut, which, as well as Ilafch, is only known for the traffic which the inhabitants carry on in incense produced in that neighbourhood; 32 miles N. of Dafar.

MERBES LE-CHATEAU, a town of France, in the department of Jenappe, and chief place of a canton, in the district of Charleroy. The place contains 661, and the canton 6382 inhabitants, on a territory of 122½ kilometres, in 17 communes.

MERCADAL, the chief town of the Terminos Mercadal in the island of Minorca, situated nearly in the middle of the island on the great road between Mahon and Ciudadella. Its streets are narrow, winding, ill paved and worse repaired. The public edifices consist of the old parish church, which is decaying, and a new one. Its situation is the least salubrious in the whole island. During the extreme heat, the inhabitants are afflicted with obdurate fevers; water is scarce, as the great public cistern is often dry during the summer. The territory of this place is about 5½ leagues in length, and 4½ in breadth. In the same district, about four leagues from Mercadal, is Ferarias, where the English have constructed barracks for 200 soldiers. The territory of Ferarias is five leagues in length and two in breadth. Few of the occupiers are husbandmen, the greater number being employed in hunting, as game is very abundant.

MERCARA, a city of Hindoostan, and residence of the rajah of Coorga; 55 miles W. of Seringapatam.

MERCATI, MICHAEL, in *Biography*, a physician and naturalist, the son of Peter Mercati, a physician of St. Miniato, in Tuscany, was born in April, 1541. After having finished his scholastic education at his native place, he was sent to Pisa, and placed under the tuition of Cesalpini, from whom he derived his taste for the study of nature. Having received his degree of doctor in philosophy and medicine in that university, he went to Rome, where he soon became known to the pope, Pius V., who appointed him superintendent of the botanical garden of the Vatican, at the age of twenty-six. In the following year he obtained the esteem of Ferdinand I., the grand duke of Tuscany, who raised him to the rank of nobility; and soon afterwards the same dignity was conferred upon him by the senate of Rome. He was in great favour with pope Gregory XIII., who honoured him with an appointment about his person, and with his full confidence, as did also his successor Sixtus V., who conferred upon him the honourable office of apostolical protonotary, and sent him into Poland with cardinal Aldo-

brandini, that he might enjoy the opportunity of increasing his collections in natural history. During this journey he greatly enriched his mineralogical cabinet, which he had already commenced at Rome. The same cardinal, when elected pope in 1592, under the title of Clem. VIII., nominated Mercati his first physician, and had in consequence higher honours to bestow upon him, when this able physician died, in 1593, in the fifty-third year of his age. His character in private life was universally esteemed, and the respect of the most distinguished persons of Rome followed him to his grave.

Mercati wrote in Italian, at the request of his patron pope Gregory, a work "On the Plague, and the Corruption of the Air, on the Gout, and on Palsy," which was printed at Rome, in 1576, in 4to: and likewise a "Dissertation on the Obelisks of Rome," printed in 1580, 4to. But he is principally remembered for his description of the subjects of natural history, particularly of mineralogy, contained in the museum of the Vatican, which was formed under the auspices of Gregory XIII. and Sixtus V. and was afterwards totally dispersed. He was about to prepare engravings of the principal subjects, when his disease, which terminated his life, interrupted his progress. His manuscript came into the hands of Carlo Dati of Florence, where it remained till the time of Clement XI., who purchased it, and caused it to be splendidly edited by Lancisi, his first physician, in 1717, under the title of "Metallotheca, opus posthumum Autoritate et Munificentia Clementis XI. Pont. Max. à tenebris in lucem educitum; operâ & stud. J. M. Lancisi Archiat. Prat. illustratum." folio. An "Appendix ad Metallothecam" was published in 1719. Eloy Dict. Hist. de la Méd. Gen. Biog.

MERCATOR, GERARD, an eminent Flemish geographer and mathematician, was born at Ruremond, in the year 1512. After he had attained a good degree of classical learning, he studied philosophy at Bois-le-Duc, and removed from thence to Louvain, where he was admitted to the degree of M.A. His studies now laid so full hold of him, that he frequently forgot the usual periods for refreshment and sleep. At the age of twenty-four he married, and then began to learn the art of engraving. His first production in this way was a description and map of the Holy Land, which he published in 1537, when he was only twenty five years of age. In the year 1541 he made a terrestrial globe, which proved the means of introducing him to the patronage of the emperor Charles V., for whom he executed maps, globes, and a collection of other mathematical instruments. This business was the means of obtaining for him an appointment in the emperor's household. About the same time the duke of Juliers and Cleves made him his cosmographer. In 1551, Mercator produced his celestial globe, which was accompanied with a short treatise on the use of that instrument. He now left Louvain, and settled at Duisburg, where he published, at different periods, descriptions and maps of the World, Europe, Germany, France, and the British islands; these he afterwards collected together into an Atlas, to which he prefixed a treatise "On the Creation and Construction of the World." His method of laying down maps, &c. is a projection of the surface of the earth on a plane. (See MAP.) In 1568, Mercator published his "Chronologia" from the beginning of the world to that year, and immediately he gave the public a corrected edition of "The Geographical Tables of Ptolemy." He died of a paralytic stroke in 1594 at a very advanced age, and in the midst of his useful labours, at the same time projecting new works for the improvement of the science of geography. He was author of several other works besides those already noticed.

Of these the principal are as follow, 1. "Ratio scribendarum Literarum Latinarum, quas Italicas cursoriasque vocant:" 2. "De usu Annuli Astronomici:" 3. "Harmonia Evangelistarum." He had a son named Bartholomew, who wrote notes on John Sacrobosc's treatise "De Sphæra Mundi," when he was very young, as he died at the age of eighteen.

MERCATOR, NICHOLAS, an eminent astronomer and mathematician, was born in Danish Holstein about the year 1640. He received an excellent education, and his turn for mathematical studies introduced him to public regard and esteem in his country, and facilitated his correspondence with those persons who were eminent in the same sciences, in Denmark, Italy, and England. Receiving an invitation to visit this country, he came, and was so well pleased with the reception he met with, that he spent the remainder of his life in England. He was, soon after his arrival, elected a fellow of the Royal Society, and applied himself very diligently to the improvement of the sciences, but he has been charged with having borrowed the inventions of others, and adopting them as his own; and it appeared upon some occasions that he was not endowed with a very liberal mind in scientific communications. Thus, it had been observed before him, that there was an analogy between a scale of logarithmic tangents and Wright's protraction of the nautical meridian line, which consisted of the sines of the secants, though it did not appear by whom this analogy was first discovered. It seemed, however, that it was first published and introduced into the practice of navigation by Mr. Henry Bond, who mentions this property in an edition of Norwood's "Epitome of Navigation" printed about the year 1645, and he treated of it more fully in an edition of Gunter's works, printed in 1653, where he teaches, from this property, to resolve all cases of Mercator's sailing by the logarithmic tangents, independently of the table of meridional parts. This analogy had been only found to be nearly true by trials, but not demonstrated to be a mathematical property. Such demonstration was probably first discovered by Mercator, who, desirous of making the most advantage of this and another invention in navigation, invited, by a paper in the Philosophical Transactions for June 1666, the public to enter into a wager with him on his ability to prove the truth or falsehood of the supposed analogy. This proposal, not very reputable to a man of science and literature, was not taken up by any one, and Mercator reserved his demonstration: he, however, distinguished himself by many valuable pieces on philosophical and mathematical subjects. Of these we may mention "Cosmographia, five Descriptio Cæli et Terræ in Circulos, &c.:" "Rationes Mathematicæ subductæ Anno 1653:" "Hypothesis Astronomica nova et consensus ejus cum Observationibus:" "Logarithmotechnia, five methodus construendi Logarithmos, &c.:" "Institutionum Astronomicarum Libri duo." He published also some papers in the Philosophical Transactions.

MERCATOR'S *Chart*, or *Projection*, is a sea-chart, or projection of the surface of the earth in plano.

For the construction, use, advantages, &c. of which, see *Mercator's CHART*.

MERCATOR'S *Sailing*, is that performed loxodromically, by means of Mercator's charts. See *Mercator's SAILING*.

MERCATORUM FESTUM, among the Romans, a festival kept by the mercantile people on the ides, or 15th of May, in honour of Mercury, to whom they sacrificed a sow; then sprinkling themselves with the water of a fountain, called aqua Mercuri, they prayed the god to prosper their trade.

MERCATUS, or MERCADO, LOUIS, in *Biography*, an eminent physician of the 16th century, was born at Valla-

dolid, in Spain, where he became a medical teacher, and obtained such reputation, as led to wealth and honourable appointments. He was first physician to Philip II. during a period of twenty years; and on the death of that prince, in 1598, was nominated to the same office by his son and successor, Philip III. Mercado lived to the age of 86; but the latter years of his life were rendered painful by the affliction of a stone in the bladder. He was author of a considerable number of works relative to medicine and surgery, written in a better Latin style than most of those composed by the writers of Spain; nevertheless, they are chiefly borrowed from the ancients, and contain nothing that is original. The whole were collected, and printed in three volumes, folio, in 1605, and have been several times reprinted. Eloy Dict. Hist.

MERCED, LA, in *Geography*, a town of New Navarre; 90 miles S.W. of Casa Grande.—Also, a town of Chili; 50 miles S.S.W. of St. Yago.

MERCER, a county of Pennsylvania, bounded N. by Crawford, E. by Venango, S.E. by Butler, S. by Beaver, and W. by Ohio state; about 40 miles long, and 27 broad; containing about 642,000 acres, and 3220 inhabitants.—Also, a county of Kentucky, adjoining Woodford, Shelby, and Madison counties: it contains 9242 inhabitants, of whom 2169 are slaves. The chief town is Harrodsburg.

MERCHAB, or MERHAB, a fortress of Syria, in the pachalic of Tripoli, on the coast of the Mediterranean, built by the Franks, and long possessed by the knights of St. John; 8 miles N. of Tortosa.

MERCHANT, MERCATOR, is one who buys and trades in any thing: and as merchandize includes all goods and wares exposed to sale in fairs or markets, so the word merchant formerly extended to all sorts of traders, buyers, and sellers. But every one that buys and sells is not at this day under the denomination of a merchant; only those who traffic in the way of commerce, by importation or exportation, or carry on business by way of barter or exchange, and who make it their living to buy and sell, by a continued assiduity, or frequent negotiation in the mystery of merchandizing, are esteemed merchants. Those who buy goods, to reduce them by their own art or industry into other forms than they are of, and then to sell them, are artificers, and not merchants. Bankers, and such as deal by exchange, are properly called merchants. Lex. Mercat. on Merch. Com. 23.

The mercantile profession is esteemed noble, and independent. In France, by two arrears of Louis XIV., the one of 1669, the other of 1701, the nobility are allowed to trade, both by land and sea, without derogating from their nobility: and we have frequent instances of merchants ennobled in that country, in regard to the utility of their commerce, and the manufactures they have set up. In Bretagne, even a retail trader does not derogate from nobility.

When the nobles of that province are disposed for commerce, they let their nobility sleep; that is, they do not lose it, but only cease to enjoy the privileges of their noblesse while their commerce continues; and re-assume it on their giving over trade, without any letters or instruments of rehabilitation.

In republics, trading is still more valued; but no where more than in England, where the younger sons and brothers of the best families are frequently bred up to merchandize. Add to this, that many of the Italian princes are the principal merchants of their states; and think it no discredit to make their palaces serve as warehouses; and that many of the kings of Asia, and most of those of the coast of Africa and

and Guinea, traffic with the Europeans; sometimes by their families, and sometimes in person.

There are companies of merchants in London for carrying on considerable joint-trade to foreign parts. See COMPANY.

Besides these companies, there are other merchants who are distinguished by the country to which they trade; as Dutch merchants; West India merchants; Canary and Portugal merchants; Italian merchants, who trade to Leghorn, Venice, &c.; French and Spanish merchants.

The law of England, as a commercial country, pays a very particular regard to foreign merchants, in innumerable instances. Thus it is provided by Magna Charta, c. 30, that all merchants, unless beforehand publicly prohibited, shall have safe conduct to depart from, to come into, or tarry in, and to go through England, for the exercise of merchandise, without any unreasonable imposts, except in time of war: and if a war breaks out between us and their country, they shall be attached, if in England, without harm of body or goods, till the king, or his chief justice, be informed how our merchants are treated in the land with which we are at war; and if our's are secure in that land, they shall be secure in our's. Upon which Montesquieu remarks, with admiration, that the English have made the protection of foreign merchants one of the articles of their national liberty: and also, that the English know better than any other people upon earth, how to value at the same time these three great advantages, religion, liberty, and commerce. In this respect their disposition is very different from the genius of the Roman people; who, in their manners, their constitution, and even in their laws, treated commerce as a dishonourable employment, and prohibited the exercise of it to persons of birth, rank, or fortune; and equally different from the bigotry of the canonists, who looked on trade as inconsistent with Christianity, and determined at the council of Meli, under pope Urban II. A.D. 1090, that it was impossible, with a safe conscience, to exercise any traffic, or follow the profession of the law. See COMMERCE.

If a difference arise between the king and any foreign state, alien merchants are to have forty days notice, or longer time, to sell their effects and leave the kingdom. 27 Ed. III. stat. 2. cap. 17.

The principal qualifications requisite for the profession of a merchant, are, 1. To know how to keep books single or double, viz. journals, ledgers, and others. 2. To draw invoices, contracts, charter-parties, policies of assurance, bills of exchange, letters missive, &c. 3. To know the relations between the money, weights, and measures, of several countries. 4. To know the places where the several kinds of merchandise are manufactured, in what manner made, what the materials composed of, and whence; the preparation the materials require before they are wrought; and the merchandises afterwards. 5. The lengths and breadths of stuffs, as silks, wools, hairs, linens, &c.; and the regulations of the places where they are manufactured; and their different prices at different seasons. 6. The dyeing and the ingredients for the formation of the different colours. 7. The merchandises that abound or are more rare, in one country than another; their kinds and qualities; and the manner of trafficking in them to the best advantage, whether by land, by sea, or river. 8. The commodities permitted or prohibited, both for the import and export of a state. 9. The price of exchange, according to the course of several places, and what it is that raises or lowers it. 10. The duties to be paid, both at the import and export of wares, according to the usage of the place, the tariffs, regulations, &c. 11. The

manner of packing, bailing, and tunning merchandises, to keep them either in magazines, or in voyages, &c. 12. On what terms a merchant vessel may be freighted and insured. 13. The goodness and value of every thing requisite for the construction or refitting of vessels, the prices of woods, cordage, masts, anchors, sails, and other necessaries. 14. The wages ordinarily given captains, officers, and sailors; and the manner of contracting with them. 15. The foreign languages, which may be reduced to four principal ones; viz. the Spanish, used almost through all the East, particularly on the coast of Africa, from the Canaries to the Cape of Good Hope; the Italian, used throughout the coasts of the Mediterranean, and many places of the Levant; the Teutonic, or German, used throughout most countries of the North; and the French, which is now become almost universally current. 16. The consular jurisdiction, the laws, customs, companies, colonies, chambers of insurance, consulates in the several countries; and, in general, all the ordinances, regulations, and policies, relating to commerce.

MERCHANT Court, or Court-Merchant, a kind of judicatory power, vested in merchants, chosen for that purpose, in several parts of Europe: in order to decide and determine, in a summary way, all differences and litigations among themselves and their dependents.

The affairs of merchants are accompanied with such a variety of circumstances, such new and unusual contingencies, which change and differ in every age, with a multitude of niceties and punctilios; and those again altering, as the customs and usages of countries and states do alter, that it has been found impracticable to make any laws that could extend to all cases: and our law itself does tacitly acknowledge its own imperfection in this case, by allowing the custom of merchants to pass as a kind of law in cases of difficulty. See CUSTOM of Merchants.

MERCHANT, Law. See LAW.

MERCHANT-Ship. See SHIP.

MERCHANT-Statute. See STATUTE.

MERCHANT, Tenant per Statute. See TENANT.

MERCHENLAGE, MERCIORUM Lex, was the law of the people here called the Mercians. Camden, in his Britannia, says, that in the year 1016 this kingdom was divided into three parts; whereof the West Saxons had one, governing it by the laws called West Saxonlage, which contained these nine shires, viz. Kent, Sussex, Surrey, Berks, Hampshire, Wilts, Somerset, Dorset, and Devon; the Danes had the second, containing fifteen shires, i. e. York, Derby, Nottingham, Leicester, Lincoln, Northampton, Bedford, Bucks, Hertford, Essex, Middlesex, Norfolk, Suffolk, Cambridge, and Huntingdon, which was governed by the laws called Danelage; and the third part was in possession of the Mercians, whose laws were called Merchenlage, and contained eight shires, Gloucester, Worcester, Hereford, Warwick, Oxford, Chester, Salop, Stafford; from which three, king William I. chose the best, and with the other laws ordained them to be the laws of the kingdom. Camd. Brit. p. 94. See COMMON Law.

MERCIER, BARTHOLOMEW, in Biography, known under the name of the abbé St. Leger, was born at Lyons in 1784. He entered into the religious society of St. Genevieve, of which he became librarian. Louis XV. gave him the abbey of St. Leger of Soissons, of which he was deprived and reduced to indigence in the revolution. He died in 1799. Mercier was a man of erudition, and one of the first bibliographers in Europe. His works are, 1. "Letters on the Bibliography of Debure," 8vo.; 2. "Letters on the true Author of the Political Testament of Cardinal Richelieu;" 3. "Supplement to Marchand's History of Printing," 4to.; 4. "Let-

ter concerning the Maid of Orleans;" 5. "Dissertation on the Author of the Book on the Imitation of Jesus Christ (Kempis);" 6. "Notice of a rare Book, entitled 'Pedis Admirandæ,' by J. d'Artis;" 7. "On the Letters attributed to Pope Ganganelli;" 8. "Letters on different rare Editions of the 15th Century;" 8vo. 9. "Library of Romances," translated from the Greek, 2 vols. &c. He was concerned in the *Journal de Trevoux*, and the *Magazine Encyclopédique*.

MERCHET. See MARCHET and BOROUGH-*Englisb*.

MERCKLEIN, GEORGE ABRAHAM, in *Biography*, a learned physician, and son of a physician of the same name, was born at Weissemburg, in Franconia, in November 1644. His early education was conducted by his father; but he was afterwards sent to the universities of Nuremberg and Wittemberg, and thence to that of Padua, which was then in the highest reputation; he returned, however, to Altorf, where he took his doctor's degree in 1670. He succeeded his father, in 1683, in the office of physician to the Teutonic order of the house of Nuremberg, and was subsequently appointed first physician to two princes palatine, who were grand masters of this order. He passed a life of great activity, and is said to have brought on a consumption by the extreme ardour with which he pursued his occupations, which terminated his life in April 1702, at the age of fifty-eight. Mercklein was admitted a member of the Academy Naturæ Curioforum, under the title of Chiron I., and communicated many memoirs on medical subjects, which were published in their *Ephemeries*. He was also author and editor of the following works. "Tractatio Medica curiosa de ortu et occasu Transfusionis sanguinis," Nuremberg, 1679, 1715, in which he gives a history of this invention, and expresses forcibly his disapprobation of the practice, which he calls cruel and dangerous. "Josephi Pandolphini à Monte Martiano Tractatus de Ventositatis Spinæ, sævissimo Morbo," *ibid.* 1674. "Lindenius renovatus," an augmented edition of the work of J. Ant. Vander Linden, "De Scriptis Medicis," in two volumes 4to., 1686, and "Sylloge Casuum Medicorum Incantationi vulgò adscribi solitorum, maximèque præ cæteris memorabilium," *ibid.* 1698, 1715, 4to.: a curious subject, but treated with too little discrimination between real and supposititious facts. *Eloy Dict. Hist. Gen. Biog.*

MERCŒUR, in *Geography*, a town of France, in the department of the Correze, and chief place of a canton, in the district of Tulle; 18 miles S. of Tulle. The place contains 825, and the canton 6971 inhabitants, on a territory of 225 kilometres, in 11 communes.

MERCURIAL, something that consists of, or bears a relation to mercury, or quicksilver.

We say also, a mercurial person, to denote a person of a brisk, volatile complexion; such persons being supposed by astrologers to be under the more immediate influence of the planet Mercury. We say, mercurial fumes, mercurial spirits, &c. with reference to the mineral mercury.

MERCURIAL *Level*. See LEVEL.

MERCURIAL *Medicines*. See MERCURIALS.

MERCURIAL *Phosphorus, Pump, Salivation, Thermometer*. See the substantives.

MERCURIAL *Unguents, Frictions, &c.* See SALIVATION.

MERCURIAL *Waters*. See WATER.

MERCURIALS, medicines composed or prepared of mercury, or quicksilver. See MERCURY in the *Materia Medica*.

MERCURIALI, GIROLAMO, in *Biography*, a learned and eminent physician, was born at Forli, in Romagna, in September 1530. The places at which he received his edu-

cation are not accurately known, but probably were Bologna and Padua, at the latter of which he is said to have received his doctor's degree; but some assert, that he graduated at Venice in 1555. He settled in the practice of his profession at his native town, and at the age of 32 was delegated on some public business to pope Pius IV., at Rome. He evinced so much talent, and acquired so much esteem at the pontifical court, especially with cardinal Alexander Farnese, that he was honoured with the citizenship of Rome, and was strongly invited to reside there. The opportunities which the public libraries and collections of antiquities in that metropolis presented for the pursuit of his favourite studies, led him to accept the invitation; and during his abode there, he not only employed himself in his professional concerns, but studied the classical literature, and the monuments of antiquity with great ardour. The result of these researches was a learned and elegant work, which acquired him much celebrity in the literary world, and which was first published at Venice in 1569, under the title of "De Arte Gymnasticâ Libri sex," 4to. It was many times reprinted. It is rather to be regarded as a philological than a medical performance; since, while it throws much light on the private life and customs of the ancients, its reasonings and precepts are almost wholly derived from their schools. The reputation of this work brought him an invitation, in the same year, to the first medical chair in the university of Padua, which he accepted, and was successor to Anthony Francanzano, a man of such high reputation, that he had been called the Esculapius of his age. The character of Mercuriali, however, was not diminished by the splendour of that of his predecessor, and his fame soon extended throughout Europe. In 1573 he was called to Vienna by the emperor Maximilian II., to consult respecting a severe illness under which that personage laboured; and his treatment was so successful, that he returned loaded with valuable presents, and honoured with the dignities of a knight and count palatine. He had fulfilled the duties of his professorial office during the period of eighteen years, and his stipend had been gradually augmented to a greater sum than had ever been allotted to a medical chair, when, in 1587, he removed to Bologna, where he was attended by a numerous audience. This removal has been partly attributed to a degree of dissatisfaction or self-accusation, in consequence of an error of judgment, which had been committed by him and Capivaccio, several years before, when they were called to Venice, in order to give their advice respecting a pestilential disorder, which prevailed in that city. On this occasion both he and his colleague seem to have fallen into the mistake of several medical theorists, of denying the reality of contagion; and their counsels were said to have been productive of extensive mischief. Nevertheless his reputation appears to have suffered little from this error; for he was invited by Ferdinand, the grand duke of Tuscany, to settle at Pisa in 1599, where he was ordered a stipend of eighteen hundred golden crowns, which was ultimately raised to two thousand. He had not resided long at Pisa, however, before the severe calculous affections, under which he laboured, rendered him incapable of attending to his professional and professorial duties, and he retired to his native town. He sunk under his disorder in 1606, and was interred, with great honours, in a chapel, which he had himself erected at Forli. He left a large property in money and effects, among which was a valuable collection of pictures; and he made a great number of charitable bequests.

Mercuriali was a voluminous writer, as the following catalogue of his works will evince. He was a learned commentator on Hippocrates, and edited a classified collection of his

his works. Like the learned of his age, however, he was bigoted to the doctrines of the ancients, and fond of hypothetical reasoning, to the disparagement of sound observation; and he thronged his pupils with the same erroneous principles. His first publication was a tract entitled "Nomothefaurus, seu Ratio lactandi Infantes." His second, the work "De Arte Gymnastica" before mentioned. 3. "Variarum Lectionum in Medicina Scripturis et aliis, Libri iv.," Venice 1571. 4. "De Morbis Cutaneis, et omnibus corporis humani Excrementis," ib. 1572. 5. "Tractatus de Maculis pelliteris et Hydrophobia," Basle, 1577. 6. "De Pestilentia in uniuersum, præsertim uero de Veneta et Patavina," Venice 1577. 7. "Hippocratis Opera Græce et Latine," ibid. 1578. 8. "De Morbis Muliebribus Prælectiones," Basle, 1582. 9. "De Morbis puerorum Tractatus locuple illumi," Venice, 1583. 10. "De Venenis et Morbis uenensibus," ibid. 1584. 11. "De Decoratione liber," ibid. 1585. 12. "Consultationes et Responsa Medicinalia." Four volumes were successively published in 1587, 1590, and 1597; and were republished together after his death. 13. "Tractatus de Compositione Medicamentorum, De Morbis oculorum et aurium," ibid. 1590. 14. "De Horum Generatione," 1597. 15. "Commentarii in Hippoc. Coi Prognostica, Prærbetica, &c." ibid. 1597. 16. "Medicina Præctica, seu, de cognoscendis, discernendis, et curandis omnibus humani corporis affectibus," Francfort, 1602, folio. All these works have been several times reprinted, and some of them were selected after his death, and printed together, under the title of "Opuscula aurea et selectiora," Venice, 1644, folio. Eloy Dict. Hist. de la Med. Gen. Biog.

MERCURIALIS, in *Botany*, is said to have been so named, in ancient times, after Mercury, its reputed discoverer. This etymology is at least as probable, if not so ingenious, as that preferred by Ambrosius, who says *Mercurialis* is properly *Muliercularis*, because it is used by young wenches (*mulierculus*) as a laxative, in fallads. If the Linnæan *Mercurialis* be intended, certainly a very small dose would be sufficient, if not dangerous, and we cannot but suspect a confusion of different plants under the name in question. A similar error respecting the English name, Mercury, has crept into our article **LINOZOSTIS**, without any communication with the writer of the present. The plant called English Mercury is *Chenopodium Bonus-Henricus*, an excellent pot-herb, very nearly akin to Spinach; whereas the *Mercurialis*, or Mercury, properly so denominated, is a virulent poison, from the use of which, by mistake for the former, the most dangerous consequences have followed, as Ray and others relate. Such an error is the more carefully to be guarded against, as this poisonous plant is by far the most common of the two. See **LINOZOSTIS** and **CHENOPODIUM**.—Linn. Gen. 527. Schreb. 695. Mart. Mill Dict. v. 3. Sm. Fl. Brit. 1083. Ait. Hort. Kew. ed. 1. v. 3. 408. Juss. 385. Lamarck Dict. v. 4. 116. Illustr. t. 820. Gært. t. 107.—Class and order, *Diocia Enneandria*. Nat. Ord. *Tricocceæ*, Linn. *Euphorbias*, Julf.

Gen. Ch. Male, *Cal.* Perianth in three deep, ovato-lanceolate, concave, spreading segments. *Cor.* none, except the calyx be so considered. *Stam.* Filaments from nine to twelve, capillary, straight, the length of the calyx; anthers formed of a pair of globose cells.

Female, *Cal.* Perianth as in the male. *Cor.* none. Nectary of two sharp awl shaped bodies, one at each side of the germen, and lodged in its furrow, but not always present. *Pist.* Germen superior, roundish, compressed, with a furrow at each side, hispid; styles two, reflexed, horn-like, hispid;

stigmas acute, reflexed. *Peric.* Capsule roundish, pouch-like, two-lobed, of two cells. *Seed* solitary, roundish.

Obs. *M. ambigua* is monoecious, and *M. annua* occasionally so. *M. afra*, mentioned by Schæffer, is *Hydrocotyle villosa*, a plant of a totally different nature.

Ess. Ch. Male, Calyx in three deep segments. Corolla none. Stamens from nine to twelve. Anthers of two globes.

Female, Calyx in three deep segments. Corolla none. Styles two. Capsule two-lobed, of two cells. Seeds solitary.

1. *M. perennis*. Perennial Mercury, or Dog's Mercury. —Linn. Sp. Pl. 1465. Curt. Lond. fasc. 2 t. 65. Mill. Illustr. t. 91. Fl. Dan t. 400. Engl. Bot. t. 1872. (Cynocrambe; Matth. Valgr. v. 2. 635. Camer. Epit. 998, 999. Fuchf. Hist. 444. Ger. em. 333.)—Stem quite simple. Leaves rough. Root creeping. Common and plentiful in bushy places throughout Europe, in the spring, flowering in April or May. The roots are perennial, creeping and matted together to a great extent. *Herb* fetid, dark green, roughish, 12 or 18 inches high, with a round unbranched stem, most leafy about the summit. Leaves opposite, stalked, ovate, acute, crenate, hairy, with membranous, reflexed, intrasoliateous stipules. Flowers green, always dioecious, in axillary, stalked, upright clusters. Capsule rough with hairs. When dried, the leaves often assume a blue tint, indicating the affinity of the genus to *Croton tinctorium*. This has been observed before, but we know of no experiments that have proved this plant useful in dyeing. That it is the *λυοζωστis* of Dioscorides, his description leaves no doubt, and he recommends it as a pot-herb, of a purgative quality. Possibly boiling, or the admixture of oily substances, may render it mild, and less dangerous.

2. *M. annua*. Annual, or French Mercury. Linn. Sp. Pl. 1465. Curt. Lond. fasc. 5. t. 68. Engl. Bot. t. 559. (M. mas et femina; Matth. Valgr. v. 2. 633, 634. Camer. Epit. 996, 997. Fuchf. Hist. 475, 476. Ger. em. 332. Dod. Pempt. 658.)—Stem cross-branched. Leaves ovate, smooth. Flowers racemose. Root fibrous. —Native of cultivated and waste ground, chiefly in the more temperate parts of Europe. It is common about London, Norwich, and some other towns, but not in the north of England; flowering in autumn. From the former it is readily distinguished by its fibrous annual root, and bushy stem. The whole herb moreover is smooth, of a deep shining green, smelling disagreeably, something like Elder. Leaves stalked, ovate, acute, serrated. Spikes much as in *M. perennis*, but there are no linear scales at each side of the germen, and the capsule is prickly or warty. A few male flowers are often found dispersed upon the female plant; and on the other hand, a few female ones upon the male now and then occur. The present species, like the former, is said to have been used as a pot-herb, and to be of an emollient quality. It is, we believe, the least virulent and dangerous of the two, but its nauseous flavour is not promising of any good property. The seeds are said by Lamarck to be very fattening to small birds, especially to the delicious Becafico, *Motacilla Ficedula*; which is not unlikely, considering the oily nature of several seeds in this natural order.

3. *M. ambigua*. Intermediate Mercury. Linn. Sp. Pl. 1465. Linn. fil. Dec. 1. 15. t. 8.—Stem cross-branched. Leaves ovate, nearly smooth. Flowers monoecious, in axillary tufts.—Native of Spain. Linnæus cultivated it in the Upsal garden, and found it constant from seed, yet its whole appearance is so like the last, that he was latterly disposed

to think it a variety. The *flowers* however are not spiked, but grow, male and female together, in little axillary tufts, each flower on a simple stalk, the males most numerous.

4. *M. elliptica*. Shrubby Mercury. Lamarck n. 4. (*M. lusitanica fruticosa*, amygdali folio; Tourn. Inst. 534. *M. tenuifolia fruticosa perennis*; Griseb. Lusit. 63.)—Stem cross-branched, shrubby. Leaves elliptical, crenate, smooth.—Native of Portugal. Gathered near Faro by the abbé Durand. We have seen it also in Tournefort's herbarium. This is undoubtedly a very distinct species, unknown to Linnæus. The shrubby perennial stem, and the much smaller, elliptical, obtuse, crenate, not serrated, leaves, at once distinguish it. The *flowers* are dioecious, axillary; the males in short, dense, solitary, stalked spikes; the females on single-flowered, simple, shorter stalks, two or three together. *Germs* smooth and even, accompanied at each side by a small, linear, whitish scale. The *leaves* and young twigs have often, in the dry plant, a reddish or purplish hue.

5. *M. longifolia*. Long-leaved Mercury. Lamarck n. 5.—Stem cross-branched. Leaves oblong, downy, green, with blunt serratures. Fruit woolly.—Described by Lamarck from the herbarium of Thouin. Its native country is unknown. The stem is about a foot high, branched, slender and weak, slightly downy. Leaves stalked, spreading, oblong or somewhat elliptical, about an inch and half long, and not above five or six lines broad, being of a much narrower shape than those of any other species. They are dark green, clothed on both sides with depressed hairs, which render them rather silky; the margin serrated, with short, blunt, glandular, curved teeth. *Footstalks* about three lines long, with a pair of lateral glands at the top, and a pair of short downy *stipules* at their base. *Flowers* axillary, greenish, dioecious; the males in solitary, slender, stalked spikes; females solitary, on simple short stalks. *Germs* and *capsule* hoary and woolly, accompanied by a slender scale at each side.

6. *M. tomentosa*. Downy Mercury. Linn. Sp. Pl. 1465. (*Phyllon arrhenogonon*, five mariticum; Ger. em. 333. f. 2; and *Ph. theligonon*, five feminificum; f. 3.)—Whole plant finely downy and hoary. Stem somewhat shrubby. Leaves oblong, more or less serrated.—Native of Spain and the south of France. Known from all the rest by its white hoary aspect, caused by the soft downy dense hairs which clothe every part. The stem is most branched in the male plant, the *flowers* of which grow in little round heads, either solitary, or several one above another, on simple, solitary, axillary stalks. The female *flowers* are axillary, solitary, on simple stalks, on a separate plant. Some female *flowers* nevertheless are occasionally interspersed on the former, as Gerard's cut, borrowed from Clusius, well expresses. The *leaves* of both are nearly sessile, oblong, acute, veiny, generally more or less serrated, though sometimes nearly entire. The ideas of the ancient botanists, from whence the above names originated, are truly absurd. They not only mistook the female plant for the male, on account of the shape of the capsule, in which they were pleased to find a certain anatomical resemblance; but they gratuitously supposed that the herb, on account of such resemblance, would be efficacious in procuring male children, while the real male plant was presumed to favour the generation of girls.

7. *M. indica*. Indian Mercury. Loureir. Cochinch. 628.—Stem shrubby, branched. Leaves alternate, lanceolate, smooth and naked. Styles three.—Native of Cochinchina, according to Loureiro, who says the fresh leaves, boiled in broth, have a mildly purging quality, without any

bad effects; and that the plant is called *Rau mai*, or *Luc mai*. The stem is shrubby, straight, six feet high, with round ascending branches. Leaves alternate, lanceolate, serrated, smooth and shining. *Flowers* dioecious, lateral, of the proper structure of a *Mercurialis*, except that the *germs* is said to be three-lobed, with three styles, which, as well as the alternate leaves, induces some suspicion respecting the genus. We have seen no specimen.

In the first edition of Sp. Pl. 1036, occurs a *Mercurialis procumbens*, not quoted by that name in any subsequent work of Linnæus. This however appears by the synonyms and his herbarium to be *Croton Ricinocarpus*, Sp. Pl. ed. 2. 1427. See CROTON, n. 90.

MERCURIALIS, in the *Materia Medica*, the species called French mercury, *Mercurialis annua*, with branched stalks, and smooth glossy leaves, grows wild in gardens and dung-hills. This plant is mucilaginous, and was formerly much employed as an emollient. It was eaten like spinach, and when used in considerable quantity it opens the bowels. Accordingly Tournefort informs us, that the French made a syrup of it, two ounces of which was given as a purge; and that they used it in clysters and pessaries mixing one part of honey with one and a half of juice. In England it is now disregarded. A cataplasm of the leaves has been recommended in pains of the limbs, in tumours, and even in ulcers, which it cleanses and disposes to heal. Poor people in country places use it as a cataplasm for the rheumatism, and even for the gout. There is another species, called cynorambe, and dog's mercury, *Mercurialis perennis*, which grows wild in woods and hedges: this, though more acceptable to the palate, as an cleraceous herb, than the foregoing, has lately been found to possess noxious qualities, and to act as a violent narcotic. (See Phil. Transf. N° 203.) In drying it turns blue, and steeped in water, it affords a fine deep blue colour; but which, Dr. Stokes says, is unhappily destructible both by acids and alkalies, and recoverable by no means that he hath been able to discover. Miller by Martyn.

MERCURIFICATION, in *Metallurgic Chemistry*, the obtaining the mercury from metallic minerals in its fluid form. See MERCURY in *Mixeralogy* and *Chemistry*.

MERCURIO, in *Geography*, a town of Corfica or Golo, and chief place of a canton, in the department of Corté. The canton contains 2378 inhabitants.

MERCURY, 8, in *Astronomy*, the smallest of the inferior planets, and the nearest to the sun.

The mean distance of Mercury from the sun is to that of our earth from the sun as 38710 to 100000: and his real distance from the sun 36,841,468 miles. The eccentricity 7955.4. The inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, is 7 degrees, and the secular change of the inclination by the action of the other planets + 20.43. The diameter of Mercury, measured by Dr. Bradley in 1723, in its transit over the sun's disc, with a micrometer to Huygens's telescope of 120 feet long, was found to be 10'.75; hence its diameter at the mean distance of the earth will be 7".27. M. de la Larme, from the transit in 1753, found it to be 6'.5; and therefore it may be stated at 7'. Von Zach says, that the mean apparent diameter of Mercury is not so much as 7", probably little more than 5". Its real diameter to that of the earth is nearly as 0.4 to 1, or 3180 miles. The mean apparent diameter of the sun at Mercury is = 80'; the density of Mercury to that of the earth is as 2.5833 to 1; its quantity of matter to that of the earth as 0.16536 to 1, the quantities of matter in spherical bodies being as the cubes of their diameters and densities conjointly; the weights of equal bodies,

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or gravities, on the surfaces of Mercury and the Earth, are as 1.035; to 1, such weights varying as the diameters and densities conjointly: the place of the ascending node of Mercury in 1750 $1^{\circ} 15' 23'' 43''$; secular motion of the node $1^{\circ} 12' 10''$; the annual motion of the node by the action of the other planets — 8.98; the precession 50.25, and the motion in longitude 41.27. The place of the aphelion $8^{\circ} 14' 22''$; the mean place of the planet $5^{\circ} 11' 54''$; the motion of the aphelion in longitude in 100 years $1^{\circ} 34'$. The tropical revolution of Mercury $87^{\circ} 23' 14'' 33''$; the sidereal revolution $87^{\circ} 23' 15'' 44''$. For further particulars see DENSITY, DIAMETER, DISTANCE, EXCENTRICITY, and PLACES. As the intensities of light and heat, which the planets receive from the sun, vary inversely as the squares of their distances from the sun; and as the proportional distances of Mercury and the Earth are as 4 to 10, we shall have the inverse squares $\frac{10^2}{4^2}$ to 1, or 6.25 to 1 for the relative intensities of light and heat at Mercury and the Earth.

According to sir Isaac Newton, the heat and light of the sun on the surface of Mercury, are almost seven times as intense as on the surface of the earth in the middle of summer: which, as he found by experiments made for that purpose by a thermometer, is sufficient to make water boil. Such a degree of heat, therefore, must render Mercury uninhabitable to creatures of our constitution. And if bodies on its surface be not inflamed, and set on fire, it must be because their degree of density is proportionably greater than that of such bodies as with us. The revolution of Mercury round the sun, or his year, has been already stated; but his diurnal revolution, or the length of his day, is not yet determined; nor is it certain whether he has such a motion round his own axis or not.

What variety of weather or seasons it may be liable to, we are still at a loss to determine; as not knowing the inclination of his axis to the plane of his orbit.

Mercury changes its phases, like the moon, according to its several positions with regard to the sun and earth; except only that he never appears quite full, because his enlightened side is never turned directly towards us, but when he is so near the sun as to be lost to our sight in his beams. And as his enlightened side is always towards the sun, it is plain that he shines not by any light of his own; for if he did, he would constantly appear round. This planet, when viewed with Dr. Herschel's ten feet reflector, and with other telescopes, appeared much darker than any of the solar spots, and perfectly well defined; no irregularity of form having

been perceptible at the moment of contact; but the observation appears to have been intermitted at the instant of the approach of the planet to the sun's limb. Dr. Herschel could not perceive the slightest degree of ellipticity in the form of the planet's disc.

The situation of this planet proves evidently, that the hypothesis of Ptolemy is false: for Mercury is sometimes observed betwixt the earth and sun; and sometimes beyond the sun. But the earth is never found between Mercury and the sun; which however must happen, if the spheres of all the planets encompassed the earth, as a centre, according to the Ptolemaic scheme.

The diameter of the sun, viewed from Mercury, would appear between two and three times as big as it appears on our earth; that planet being so much nearer to him than we are, and therefore the sun's disc would appear seven times as large as to us. Mercury's greatest distance from the sun, with regard to us, never exceeds twenty-eight degrees twenty minutes (see ELONGATION); whence it is seldom visible, being commonly either lost in the sun's light, or, when the most remote from the sun, in the crepusculum. The best observations of this planet are those made when it is seen on the sun's disc; for, in its lower conjunction, it passes before the sun like a little spot, eclipsing a small part of his body, only observable with a telescope.

The node from which Mercury ascends northward above the ecliptic, is in the 15th degree of Taurus; the opposite in the 15th degree of Scorpio. The earth is in these points about the 6th of November, and 4th of May, new style; and when Mercury comes to either of his nodes at his inferior conjunction about these times, he will appear in this manner to pass over the disc of the sun. But in all other parts of his orbit, his conjunctions are invisible, because he either goes above or below the sun. The first observation of this kind was that of Cassendi, in November, 1631. Several subsequent observations of the like transits are collected in Du Hamel's Hist. of the Royal Acad. of Sciences, p. 470. ed. 2. See Dr. Halley's Accounts of the Transits of Mercury and Venus, in Phil. Trans. N^o 193. See TRANSIT.

To an inhabitant of Mercury, the solar spots will appear to traverse his disc sometimes in a right line from east to west, and sometimes elliptically. As the other planets are above Mercury, their phenomena will be nearly the same there as with us. Venus and the Earth, when in opposition to the sun, will shine with full orbs, and afford a noble light to that planet.

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TABLE I. Epochs of the Mean Longitude of Mercury.

Years.	Mean Long.	Aphelion.	Node.
	S. D. M. S.	S. D. M. S.	S. D. M. S.
Nat. J. C. 0	8 24 0 44	7 16 13 21	0 24 17 48
100	11 8 5 4	7 17 47 6	0 25 29 58
1400	7 11 1 24	8 8 5 51	1 11 8 8
1500	9 25 5 44	8 9 39 36	1 12 20 18
B. N. S. 1600	10 28 14 38	8 11 13 21	1 13 32 28
C. 1700	1 8 13 26	8 12 47 6	1 14 44 38
B. 1740	2 7 51 10	8 13 24 36	1 15 13 30
B. 1760	1 22 40 2	8 13 43 21	1 15 27 56
B. 1780	3 7 28 52	8 14 2 6	1 15 42 22
1786	2 3 52 47	8 14 7 44	1 15 46 42
1787	3 27 35 50	8 14 8 40	1 15 47 25
1788	5 25 24 26	8 14 9 36	1 15 48 8
1789	7 19 7 30	8 14 10 32	1 15 48 51
1790	9 12 50 33	8 14 11 28	1 15 49 35
B. 1791	11 6 33 37	8 14 12 25	1 15 50 18
1792	1 4 22 13	8 14 13 21	1 15 51 1
1793	2 28 5 16	8 14 14 17	1 15 51 45
1794	4 21 48 20	8 14 15 13	1 15 52 28
1795	6 15 31 23	8 14 16 10	1 15 53 11
B. 1796	8 13 19 59	8 14 17 6	1 15 53 55
1797	10 7 3 3	8 14 18 2	1 15 54 38
1798	0 0 46 6	8 14 18 58	1 15 55 21
1799	1 24 29 10	8 14 19 55	1 15 56 4
C. 1800	3 18 12 13	8 14 20 51	1 15 56 48
1801	5 11 55 16	8 14 21 47	1 15 57 31
1802	7 5 38 20	8 14 22 43	1 15 58 14
1803	8 29 21 23	8 14 23 40	1 15 58 57
B. 1804	10 27 9 59	8 14 24 36	1 15 59 41
1805	0 20 53 3	8 14 25 32	1 16 0 24
1806	2 14 36 6	8 14 26 29	1 16 1 8
1807	4 8 19 10	8 14 27 25	1 16 1 51
B. 1808	6 6 7 46	8 14 28 21	1 16 2 34
1809	7 29 50 49	8 14 29 17	1 16 3 17
1810	9 23 33 53	8 14 30 13	1 16 4 1
B. 1811	11 17 16 56	8 14 31 10	1 16 4 44
1812	1 15 5 32	8 14 32 6	1 16 5 27
1813	3 8 48 36	8 14 33 2	1 16 6 10
1814	5 2 31 39	8 14 33 58	1 16 6 54
1815	6 26 14 43	8 14 34 55	1 16 7 37
B. 1816	8 24 3 19	8 14 35 51	1 16 8 20
1817	10 17 46 22	8 14 36 47	1 16 9 4
1818	0 11 29 26	8 14 37 43	1 16 9 47
1819	2 5 12 29	8 14 38 40	1 16 10 30
B. 1820	4 3 1 5	8 14 39 36	1 16 11 14

TABLE II. Mean Motion of Mercury for Years.

Years.	Mot. in Long.	Mot. Aphel.	Mot. Node.
	S. D. M. S.	S. D. M. S.	D. M. S.
1	1 23 43 3	0 0 0 56	0 0 43
2	3 17 26 7	0 0 1 52	0 1 27
3	5 11 9 10	0 0 2 49	0 2 10
B. 4	7 8 57 46	0 0 3 45	0 2 53
5	9 2 40 50	0 0 4 41	0 3 36
6	10 26 23 53	0 0 5 37	0 4 20
B. 7	0 20 6 57	0 0 6 34	0 5 3
8	2 17 55 33	0 0 7 30	0 5 46
9	4 11 38 36	0 0 8 26	0 6 30
10	6 5 21 40	0 0 9 22	0 7 13
B. 11	7 29 4 43	0 0 10 19	0 7 56
12	9 26 53 19	0 0 11 15	0 8 40
13	11 20 36 23	0 0 12 11	0 9 23
14	1 14 19 26	0 0 13 8	0 10 6
15	3 8 2 29	0 0 14 4	0 10 49
B. 16	5 5 51 6	0 0 15 0	0 11 33
17	6 29 34 9	0 0 15 56	0 12 16
18	8 23 17 12	0 0 16 52	0 12 59
B. 19	10 17 0 16	0 0 17 49	0 13 43
20	0 14 48 52	0 0 18 45	0 14 26
40	0 29 37 44	0 0 37 30	0 28 52
60	1 14 26 36	0 0 56 15	0 43 18
80	1 29 15 28	0 1 15 0	0 57 44
100	2 14 4 20	0 1 33 45	1 12 10
200	4 28 8 40	0 3 7 30	2 24 20
300	7 12 13 0	0 4 41 15	3 36 30
400	9 26 17 20	0 6 15 0	4 48 40
500	0 10 21 40	0 7 48 45	6 0 50
600	2 24 26 0	0 9 22 30	7 13 0
700	5 8 30 20	0 10 56 15	8 25 10
800	7 22 34 40	0 12 30 0	9 37 20
900	10 6 39 0	0 14 3 45	10 49 30
1000	0 20 43 20	0 15 37 30	12 1 40
1100	3 4 47 40	0 17 11 15	13 13 50
1200	5 18 52 0	0 18 45 0	14 26 0
1300	8 2 56 20	0 20 18 45	15 38 10
1400	10 17 0 40	0 21 52 30	16 50 20
1500	1 1 5 0	0 23 26 15	18 2 30
2000	1 11 26 40	1 1 15 0	24 3 20

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TABLE III.—Mean Motion of Mercury for *Days*.

Days of Month.	January.			Mot. Aph.	Mot. Node.	Days of Month.	February.			Mot. Aph.	Mot. Node.	Days of Month.	March.			Mot. Aph.	Mot. Node.
	Mot. Long.						Mot. Long.						Mot. Long.				
	S.	D.	M. S.				S.	D.	M. S.				S.	D.	M. S.		
1	0	4	5 33	0	0	1	4	10	57 22	5	4	1	8	5	32 33	9	7
2	0	8	11 5	0	0	2	4	15	2 54	5	4	2	8	9	38 6	9	7
3	0	12	16 38	1	0	3	4	19	8 27	5	4	3	8	13	43 39	10	7
4	0	16	22 10	1	1	4	4	23	13 59	6	4	4	8	17	49 11	10	8
5	0	20	27 43	1	1	5	4	27	19 32	6	4	5	8	21	54 44	10	8
6	0	24	33 15	1	1	6	5	1	25 5	6	5	6	8	26	0 16	10	8
7	0	28	38 48	1	1	7	5	5	30 38	6	5	7	9	0	5 49	10	8
8	1	2	44 20	1	1	8	5	9	36 10	6	5	8	9	4	11 21	10	8
9	1	6	49 53	2	1	9	5	13	41 42	6	5	9	9	8	16 54	10	8
10	1	10	55 26	2	1	10	5	17	47 15	6	5	10	9	12	22 26	11	8
11	1	15	0 58	2	1	11	5	21	52 47	6	5	11	9	16	27 59	11	8
12	1	19	6 31	2	2	12	5	25	58 20	7	5	12	9	20	33 32	11	9
13	1	23	12 3	2	2	13	6	0	3 53	7	5	13	9	24	39 4	11	9
14	1	27	17 36	2	2	14	6	4	9 25	7	5	14	9	28	44 37	11	9
15	2	1	23 8	2	2	15	6	8	14 58	7	6	15	10	2	50 9	11	9
16	2	5	28 41	3	2	16	6	12	20 30	7	6	16	10	6	55 42	12	9
17	2	9	34 13	3	2	17	6	16	26 3	7	6	17	10	11	1 14	12	9
18	2	13	39 46	3	2	18	6	20	31 35	8	6	18	10	15	6 47	12	9
19	2	17	45 19	3	2	19	6	24	37 8	8	6	19	10	19	12 19	12	9
20	2	21	50 51	3	2	20	6	28	42 40	8	6	20	10	23	17 52	12	9
21	2	25	56 24	3	3	21	7	2	48 13	8	6	21	10	27	23 25	12	10
22	3	0	1 56	4	3	22	7	6	53 46	8	6	22	11	1	28 57	12	10
23	3	4	7 29	4	3	23	7	10	59 18	8	6	23	11	5	34 30	13	10
24	3	8	13 2	4	3	24	7	15	4 51	8	7	24	11	9	40 2	13	10
25	3	12	18 34	4	3	25	7	19	10 23	9	7	25	11	13	45 35	13	10
26	3	16	24 7	4	3	26	7	23	15 56	9	7	26	11	17	51 7	13	10
27	3	20	29 39	4	3	27	7	27	21 28	9	7	27	11	21	56 40	13	10
28	3	24	35 12	4	3	28	8	1	27 1	9	7	28	11	26	2 12	13	10
29	3	28	40 44	4	3							29	0	0	7 45	14	10
30	4	2	46 17	5	4							30	0	4	13 18	14	11
31	4	6	51 50	5	4							31	0	8	18 50	14	11

In the Months January and February of a Bissextile Year, subtract 1 from the given Day of the Month.

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TABLE III. Mean Motion of Mercury for Days.

Days of the Month.	July.			Mot. Aphelion.	Mot. Node.	Days of the Month.	August.			Mot. Aphelion.	Mot. Node.	Days of the Month.	September.			Mot. Aphelion.	Mot. Node.
	Mot. Long.						Mot. Long.						Mot. Long.				
	S.	D.	M. S.				S.	D.	M. S.				S.	D.	M. S.		
1	0	24	48 45	28	22	1	5	1	40 35	33	25	1	9	8	32 24	38	29
2	0	28	54 18	28	22	2	5	5	46 7	33	25	2	9	12	37 57	38	29
3	1	2	59 51	28	22	3	5	9	51 40	33	26	3	9	16	43 29	38	29
4	1	7	5 23	29	22	4	5	13	57 12	33	26	4	9	20	49 2	38	29
5	1	11	10 56	29	22	5	5	18	2 45	33	26	5	9	24	54 34	38	29
6	1	15	16 28	29	22	6	5	22	8 17	34	26	6	9	29	0 7	38	30
7	1	19	22 1	29	22	7	5	26	13 50	34	26	7	10	3	5 39	39	30
8	1	23	27 33	29	22	8	6	0	19 23	34	26	8	10	7	11 12	39	30
9	1	27	33 6	29	23	9	6	4	24 55	34	26	9	10	11	16 44	39	30
10	2	1	38 38	29	23	10	6	8	30 28	34	26	10	10	15	22 17	39	30
11	2	5	44 11	30	23	11	6	12	36 0	34	26	11	10	19	27 50	39	30
12	2	9	49 44	30	23	12	6	16	41 33	35	27	12	10	23	33 22	39	30
13	2	13	55 16	30	23	13	6	20	47 5	35	27	13	10	27	38 55	39	30
14	2	18	0 49	30	23	14	6	24	52 38	35	27	14	11	1	44 27	40	31
15	2	22	6 21	30	23	15	6	28	58 11	35	27	15	11	5	50 0	40	31
16	2	26	11 54	30	23	16	7	3	3 43	35	27	16	11	9	55 32	40	31
17	3	0	17 26	31	24	17	7	7	9 16	35	27	17	11	14	1 5	40	31
18	3	4	22 59	31	24	18	7	11	14 48	35	27	18	11	18	6 37	40	31
19	3	8	28 31	31	24	19	7	15	20 21	36	27	19	11	22	12 10	40	31
20	3	12	34 4	31	24	20	7	19	25 53	36	28	20	11	26	17 43	41	31
21	3	16	39 37	31	24	21	7	23	31 26	36	28	21	0	0	23 16	41	31
22	3	20	45 9	31	24	22	7	27	36 58	36	28	22	0	4	28 48	41	32
23	3	24	50 42	31	24	23	8	1	42 31	36	28	23	0	8	34 20	41	32
24	3	28	56 14	32	24	24	8	5	48 4	36	28	24	0	12	39 53	41	32
25	4	3	1 47	32	25	25	8	9	53 36	37	28	25	0	16	45 25	41	32
26	4	7	7 19	32	25	26	8	13	59 9	37	28	26	0	20	50 58	41	32
27	4	11	12 52	32	25	27	8	18	4 41	37	28	27	0	24	56 30	42	32
28	4	15	18 24	32	25	28	8	22	10 14	37	29	28	0	29	2 3	42	32
29	4	19	23 57	32	25	29	8	26	15 46	37	29	29	1	3	7 36	42	32
30	4	23	29 30	33	25	30	9	0	21 19	37	29	30	1	7	13 8	42	32
31	4	27	35 2	33	25	31	9	4	26 51	37	29						

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TABLE III. Mean Motion of Mercury for *Days*.

Days of the Month.	October.				Days of the Month.	November.				Days of the Month.	December.									
	Mot. Long.					Mot. Aphelion.	Mot. Node.	Mot. Long.				Mot. Aphelion.	Mot. Node.							
	S.	D.	M.	S.				SEC.	SEC.		S.			D.	M.	S.	SEC.	SEC.		
1	1	11	18	41	42	33	1	5	18	10	30	47	36	1	9	20	56	47	52	40
2	1	15	24	13	42	33	2	5	22	16	3	47	36	2	9	25	2	19	52	40
3	1	19	29	46	43	33	3	5	26	21	35	47	36	3	9	29	7	52	52	40
4	1	23	35	19	43	33	4	6	0	27	8	47	37	4	10	3	13	24	52	40
5	1	27	40	51	43	33	5	6	4	32	40	48	37	5	10	7	18	57	52	40
6	2	1	46	23	43	33	6	6	8	38	13	48	37	6	10	11	24	30	52	40
7	2	5	51	56	43	33	7	6	12	43	45	48	37	7	10	15	30	2	53	41
8	2	9	57	29	43	33	8	6	16	49	18	48	37	8	10	19	35	35	53	41
9	2	14	3	1	44	34	9	6	20	54	50	48	37	9	10	23	41	7	53	41
10	2	18	8	34	44	34	10	6	25	0	23	48	37	10	10	27	46	40	53	41
11	2	22	14	6	44	34	11	6	29	5	56	49	37	11	11	1	52	12	53	41
12	2	26	19	39	44	34	12	7	3	11	28	49	37	12	11	5	57	45	53	41
13	3	0	25	11	44	34	13	7	7	17	1	49	38	13	11	10	3	17	53	41
14	3	4	30	44	44	34	14	7	11	22	33	49	38	14	11	14	8	50	54	41
15	3	8	36	17	44	34	15	7	15	28	6	49	38	15	11	18	14	22	54	41
16	3	12	41	49	45	34	16	7	19	33	38	49	38	16	11	22	19	55	54	42
17	3	16	47	22	45	35	17	7	23	39	11	49	38	17	11	26	25	28	54	42
18	3	20	52	54	45	35	18	7	27	44	43	50	38	18	0	0	31	0	54	42
19	3	24	58	27	45	35	19	8	1	50	16	50	38	19	0	4	36	33	54	42
20	3	29	3	59	45	35	20	8	5	55	49	50	38	20	0	8	42	5	55	42
21	4	3	9	32	45	35	21	8	10	1	21	50	38	21	0	12	47	38	55	42
22	4	7	15	4	45	35	22	8	14	6	54	50	39	22	0	16	53	10	55	42
23	4	11	20	37	46	35	23	8	18	12	26	50	39	23	0	20	58	43	55	42
24	4	15	26	10	46	35	24	8	22	17	59	51	39	24	0	25	4	16	55	42
25	4	19	31	42	46	35	25	8	26	23	31	51	39	25	0	29	9	48	55	43
26	4	23	37	15	46	35	26	9	0	29	4	51	39	26	1	3	15	21	55	43
27	4	27	42	47	46	36	27	9	4	34	36	51	39	27	1	7	20	53	56	43
28	5	1	48	20	46	36	28	9	8	40	9	51	40	28	1	11	26	26	56	43
29	5	5	53	52	47	36	29	9	12	45	42	51	40	29	1	15	31	58	56	43
30	5	9	59	25	47	36	30	9	16	51	14	51	40	30	1	19	37	31	56	43
31	5	14	4	57	47	36								31	1	23	43	3	56	43

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TABLE VI. Logarithms of the Distance of Mercury from the Sun.

Argument. Mean Anomaly of Mercury.							
	Sig. O.		Sig. I.		Sig. II.		
D.	Logarithms.	Differ.	Logarithms.	Differ.	Logarithms.	Differ.	D.
0	9.668993	8	9.661990	476	9.640787		30
1	9.668985	23	9.661514	492	9.639832	955	29
2	9.668962	38	9.661022	507	9.638862	970	28
3	9.668924	54	9.660515	524	9.637875	987	27
4	9.668870	70	9.659991	539	9.636872	1003	26
5	9.668800	85	9.659452	555	9.635853	1019	25
6	9.668715	101	9.658897	571	9.634819	1034	24
7	9.668614	117	9.658326	587	9.633768	1051	23
8	9.668497	132	9.657739	603	9.632702	1066	22
9	9.668365	147	9.657136	619	9.631619	1083	21
10	9.668218	163	9.656517	635	9.630521	1098	20
11	9.668055	178	9.655882	650	9.629407	1114	19
12	9.667877	194	9.655232	667	9.628277	1130	18
13	9.667683	210	9.654565	682	9.627131	1146	17
14	9.667473	226	9.653883	698	9.625970	1161	16
15	9.667247	241	9.653185	714	9.624793	1177	15
16	9.667006	256	9.652471	731	9.623600	1193	14
17	9.666760	272	9.651740	746	9.622392	1208	13
18	9.666478	287	9.650994	763	9.621169	1223	12
19	9.666191	304	9.650231	778	9.619930	1239	11
20	9.665887	319	9.649453	795	9.618676	1254	10
21	9.665568	335	9.648658	810	9.617407	1269	9
22	9.665233	350	9.647848	827	9.616123	1284	8
23	9.664883	366	9.647021	842	9.614823	1300	7
24	9.664517	383	9.646179	858	9.613509	1314	6
25	9.664134	398	9.645321	875	9.612179	1330	5
26	9.663736	412	9.644446	891	9.610835	1344	4
27	9.663324	429	9.643555	908	9.609477	1358	3
28	9.662895	445	9.642647	923	9.608104	1373	2
29	9.662450	460	9.641724	937	9.606717	1387	1
30	9.661990		9.640787		9.605316	1401	0
	Sig. XI.		Sig. X.		Sig. IX.		

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TABLE VI. Logarithms of the Distance of Mercury from the Sun.

Argument. Mean Anomaly of Mercury.							
	Sig. III.		Sig. VI.		Sig. V.		
D.	Logarithms.	Differ.	Logarithms.	Differ.	Logarithms.	Differ.	D.
0	9.605316		9.557972	1692	9.510077		30
1	9.603901	1415	9.556280	1694	9.508747	1330	29
2	9.602472	1429	9.554586	1696	9.507447	1300	28
3	9.601029	1443	9.552890	1695	9.506179	1268	27
		1456				1236	
4	9.599573	1469	9.551195	1695	9.504943	1201	26
5	9.598104	1482	9.549500	1693	9.503742	1167	25
6	9.596622	1495	9.547807	1691	9.502575	1130	24
7	9.595127	1507	9.546116	1688	9.501445	1092	23
		1519				1054	
8	9.593620	1532	9.544428	1679	9.500353	1014	22
9	9.592101	1543	9.542743	1674	9.499299	972	21
10	9.590569	1554	9.541064	1667	9.498285	930	20
11	9.589026	1566	9.539390	1660	9.497313	887	19
		1577				842	
12	9.587472	1586	9.537723	1631	9.496383	750	18
13	9.585906	1597	9.536063	1618	9.495496	703	17
14	9.584329	1607	9.534412	1606	9.494654	655	16
15	9.582743	1616	9.532770	1592	9.493857	605	15
		1625				555	
16	9.581146	1634	9.531139	1577	9.493107	504	14
17	9.579539	1642	9.529521	1560	9.492404	453	13
18	9.577923	1649	9.527915	1542	9.491749	402	12
19	9.576298	1656	9.526323	1524	9.491144	350	11
		1663				296	
20	9.574664	1668	9.524746	1505	9.490589	243	10
21	9.573022	1674	9.523186	1484	9.490085	189	9
22	9.571373	1679	9.521644	1461	9.489632	135	8
23	9.569717	1684	9.520120	1437	9.489230	82	7
		1687				28	
24	9.568054	1687	9.518615	1412	9.488880		6
25	9.566386	1687	9.517131	1386	9.488584		5
26	9.564712	1690	9.515670	1358	9.488341		4
27	9.563033		9.514233		9.488152		3
28	9.561349		9.512821		9.488017		2
29	9.559662		9.511435		9.487935		1
30	9.557972		9.510077		9.487907		0
	Sig. VIII.		Sig. VII.		Sig. VI.		

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TABLE VII. Reduction to the Ecliptic both in Longitude and Distance.

Argument. The Longitude of Mercury — the Longitude of the Node.										
Degrees.	Sig. O.		Sub. from Log.	Sig. I. —		Sub. from Log.	Sig. II. —		Sub. from Log.	Degrees.
	Sig. VI. —			Sig. VII. —			Sig. VIII. —			
	M	s.	M	s.	M	s.				
0	0	0	0	11	7	808	11	9	2432	30
1	0	26	1	11	20	858	10	56	2480	29
2	0	53	4	11	32	908	10	41	2528	28
3	1	20	9	11	43	959	10	26	2574	27
4	1	47	16	11	54	1011	10	9	2621	26
5	2	13	24	12	4	1063	9	53	2665	25
6	2	39	35	12	13	1118	9	34	2708	24
7	3	5	48	12	21	1172	9	16	2749	23
8	3	31	62	12	28	1226	8	57	2789	22
9	3	57	79	12	34	1281	8	37	2829	21
10	4	23	98	12	40	1337	8	17	2867	20
11	4	48	118	12	45	1392	7	56	2903	19
12	5	13	140	12	48	1448	7	34	2937	18
13	5	37	164	12	50	1506	7	12	2969	17
14	6	1	189	12	51	1562	6	50	3000	16
15	6	25	216	12	52	1619	6	27	3030	15
16	6	48	246	12	51	1675	6	3	3058	14
17	7	11	277	12	50	1731	5	39	3084	13
18	7	33	309	12	48	1788	5	15	3108	12
19	7	54	343	12	45	1845	4	50	3130	11
20	8	14	378	12	40	1901	4	25	3151	10
21	8	34	415	12	35	1957	3	59	3169	9
22	8	53	454	12	29	2012	3	34	3186	8
23	9	12	493	12	22	2066	3	8	3201	7
24	9	31	534	12	15	2120	2	41	3213	6
25	9	50	577	12	6	2173	2	15	3224	5
26	10	7	622	11	56	2227	1	47	3233	4
27	10	23	667	11	45	2280	1	21	3240	3
28	10	39	713	11	35	2332	0	54	3245	2
29	10	54	760	11	22	2382	0	27	3248	1
30	11	7	808	11	9	2432	0	0	3249	0
	Sig. XI. +		Sub. from Log.	Sig. X. +		Sub. from Log.	Sig. IX. +		Sub. from Log.	
	Sig. V. +			Sig. IV. +			Sig. III. +			

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TABLE VIII. Heliocentric Latitude of Mercury.

Argument. The Longitude of Mercury — the Longitude of the Node.							
Degrees.	Sig. O. N.	Differ.	Sig. I. N.	Differ.	Sig. II. N.	Differ.	Degrees.
	Sig. VI. S.		Sig. VII. S.		Sig. VIII. S.		
	D. M. S.	M. S.	D. M. S.	M. S.	D. M. S.	M. S.	
0	0 0 0	7 18	3 29 37	6 20	6 3 30	3 37	50
1	0 7 18	7 19	3 35 57	6 15	6 7 7	3 30	29
2	0 14 37	7 18	3 42 12	6 11	6 10 37	3 23	28
3	0 21 55	7 15	3 48 23	6 6	6 14 0	3 18	27
4	0 29 13	7 18	3 54 29	6 1	6 17 18	3 11	26
5	0 36 31	7 17	4 0 30	5 58	6 20 29	3 3	25
6	0 43 48	7 16	4 6 28	5 54	6 23 32	2 56	24
7	0 51 4	7 15	4 12 22	5 49	6 26 28	2 49	23
8	0 58 19	7 14	4 18 11	5 44	6 29 17	2 42	22
9	1 5 33	7 12	4 23 55	5 40	6 31 59	2 35	21
10	1 12 45	7 11	4 29 35	5 35	6 34 34	2 27	20
11	1 19 56	7 10	4 35 10	5 30	6 37 1	2 20	19
12	1 27 6	7 9	4 40 40	5 24	6 39 21	2 13	18
13	1 34 15	7 7	4 46 4	5 19	6 41 34	2 5	17
14	1 41 22	7 5	4 51 23	5 14	6 43 39	1 58	16
15	1 48 27	7 4	4 56 37	5 8	6 45 37	1 50	15
16	1 55 31	7 2	5 1 45	5 3	6 47 27	1 44	14
17	2 2 33	6 59	5 6 48	4 58	6 49 11	1 36	13
18	2 9 32	6 55	5 11 46	4 52	6 50 47	1 28	12
19	2 16 27	6 53	5 16 38	4 46	6 52 15	1 20	11
20	2 23 20	6 50	5 21 24	4 40	6 53 35	1 12	10
21	2 30 10	6 48	5 26 4	4 34	6 54 47	1 5	9
22	2 36 58	6 46	5 30 38	4 28	6 55 52	0 57	8
23	2 43 44	6 42	5 35 6	4 22	6 56 49	0 50	7
24	2 50 26	6 40	5 39 28	4 17	6 57 39	0 44	6
25	2 57 6	6 37	5 43 45	4 11	6 58 23	0 36	5
26	3 3 43	6 33	5 47 56	4 4	6 58 59	0 27	4
27	3 10 16	6 30	5 52 0	3 57	6 59 26	0 19	3
28	3 16 46	6 27	5 55 57	3 50	6 59 45	0 11	2
29	3 23 13	6 24	5 59 47	3 43	6 59 56	0 4	1
30	3 29 37		6 3 30		7 0 0		0
	Sig. XI. S.		Sig. X. S.		Sig. IX. S.		
	Sig. V. N.		Sig. IV. N.		Sig. III. N.		

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As a specimen of the use of the preceding tables, we shall give the following example from the Astronomy of Professor Vince, whose polite compliance with our wish to extract the preceding tables from his valuable work, demands our respectful acknowledgment.

To compute the Heliocentric Latitude and Longitude of Mercury, and Logarithm of his Distance from the Sun.—From Table I. of the epochs, take out the epochs of the mean longitude of the aphelion and node, for the given year, and place them in an horizontal line. But if the given year be not found in that table, take the nearest year preceding the given year, as an epoch, and take out as before; under which (Table II.) place the mean motion, in longitude, of the aphelion and node, answering to the number of years elapsed since the epoch to the given year.

Under these, write down (Table III.) the mean motions of the same, for the given day of the month.

Under these, write down (Table IV.) the mean motions of the same, for the given hours, minutes, and seconds.

Add together the numbers in the several columns, rejecting 12 S, or any multiple thereof, if they occur; and you get the mean longitude, places of the aphelion, and node for the given time.

Subtract the longitude of the aphelion from the mean longitude, and the remainder is the mean anomaly.

With the mean anomaly enter Table V., and take out the equation of the orbit, making proportion for the minutes

and seconds, if there be any, correcting the result of the proportion for second differences.

Apply the equation, with its proper sign, to the mean longitude, and you get the longitude on the orbit, from the mean equinox.

From the longitude of Mercury in his orbit, subtract the longitude of the node, and you get the argument, called the *argument of latitude*.

To the longitude on the orbit thus found, apply the reduction (Table VII.) with its proper sign, and you have the longitude upon the ecliptic, reckoned from the mean equinox.

To the longitude thus found, apply the nutation, or equation of the equinoxes in longitude with its proper sign, and you get the true longitude of Mercury on the ecliptic, from the true equinox.

With the argument of latitude enter Table VIII., and take out the heliocentric latitude, making proportion for the minutes and seconds, if necessary, correcting the result of the proportion for second differences, and this is the true heliocentric latitude of Mercury.

With the mean anomaly of Mercury enter Table VI., and take out the logarithm of the distance, making proportion for the minutes and seconds, if necessary.

With the argument of latitude enter Table VII., and in the column *Sub. Log.* take out the number, making proportion for minutes and seconds, if necessary; and subtracting it from the logarithm of the distance last found, you have the logarithm of the curtate distance.

Example.—What is the heliocentric Latitude and Longitude of Mercury on June 3, 1793, at 5^h 17' 19", mean Time at Greenwich, and the Logarithm of his Distance from the Sun?

	Longitude.	Aphelion.	Node.
Epoch for 1793 - -	^s 2 ^o 28 ['] 5 ["] 16	^s 8 ^o 14 ['] 14 ["] 17	^s 1 ^o 15 ['] 51 ["] 45
Mean Motion to June 3	9 0 13 34	24	18
----- for 5 ^h -	51 9		
----- for 17' -	2 54		
----- for 19" -	3		
Mean Long. - -	11 29 12 56	8 14 14 41	1 15 52 3
Equation Table V. -	- 23 39 59	11 29 12 56	11 5 32 57
Long. on Orbit - -	11 5 32 57	3 14 58 15	9 19 40 54
Reduct. Table VII. -	+ 8 10	Mean Anom.	Arg. of Lat.
Long. from mean Equin.	11 5 41 7	Hence, Tab. VI.	Hence, Tab. VIII.
Nutation - - -	- 6	Log. dist. 9.582789	Hel. lat. 6° 35' 21" S.
True Long. on Ecl. -	11 5 41 1	Reduct. - 2878	
		9.579911	
		Log. of curtate distance from the Sun.	

MERCURY, in *Botany*, &c. See MERCURIALIS.

MERCURY, *English*. See CHENOPODIUM.

MERCURY is a metal of a silvery-white colour, and fluid at the usual temperature of the atmosphere. It is known under a variety of denominations: the common name among the ancients was *hydrargyrum*, q. d. water of silver. The moderns commonly call it *mercury*, from some supposed relation it bears to the planet of that name. In English it is

popularly called *quicksilver*, from its appearance. Many of the chemists call it *Proteus*, from the variety of forms, colours, &c. it passes through in their preparations.

§ 1. Ores of Mercury.

1. *Native Mercury*; *Gediegen queck-silber*, Wern.; *Mer-cure natif*, Haüy.

Its colour is that of silver.

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It is found as globules in the cells of other ores of mercury, and as large masses in druse cavities, &c.

When pure it is perfectly fluid; it feels very cold, and as if wet, but does not adhere to the finger. It has neither smell nor taste.

Its lustre is metallic splendid. Sp. gr. 13.568, Cavendish, Brissot; 13.581, Haüy; 13.600, Klapp.

Native mercury is generally pure, but sometimes it is amalgamated with some silver, though not sufficiently saturated to be referrible to the following species, into which a transition is thus formed.

There are only a few places where native mercury has been found in abundance, such as Idria, the Palatinate, and Spain; but in small quantities it occurs almost always together with cinnabar and other mercurial ores, in stetz-rocks, which appear to be subordinate to some coal formation. See the sequel of this article, and MIXTURE.

For the use, and chemical and physical properties of mercury, see the sequel of this article.

2. *Native Amalgam*; *Natürliches amalgam*, Wern.; *Mercur argentale*, Haüy.

Its colour varies between that of tin and silver.

It is seldom found massive; oftener disseminated, in superficial laminæ, and sometimes crystallized. The crystals hitherto observed are: 1. The regular octahedron with all its edges truncated, mentioned by Romé de l'Isle (*Mercur argentale émarginé*, Haüy, pl. 65, fig. 24.) 2. The rhomboidal or garnet dodecahedron (*Mercur argentale dodécaèdre*, Haüy, ib. fig. 25.) This occurs more frequently than the others, and is by Cordier considered as the primitive crystal. 3. The preceding truncated on the edges (*Mercur argentale triforme*, Haüy, ib. fig. 26.) Also the leucite crystal, or the double eight-sided pyramid, flatly acuminate on each extremity by four planes set on the alternate lateral edges, is mentioned among the modifications of this substance.

The crystals are never large, generally of the size of a small pea: they are usually imbedded, seldom several of them grouped together.

Externally it is shining and splendid, but less so than native mercury: lustre metallic. When scraped it becomes dull.

Fracture conchoidal. It is more or less soft, sometimes approaching to fluid; not particularly brittle. Spec. grav. 14.1192, as a mean of several experiments by Cordier.

Besides this pasty semifluid amalgam, there is a more solid variety, the fracture of which is more imperfectly flat conchoidal, sometimes passing into fine-grained uneven, and which, when pressed between the fingers, or cut with a knife, gives out a more creaking sound than the other variety.

Exposed to the fire the mercury is volatilized, and a button of silver remains.

The variety analysed by Heyer contained 74 parts of mercury and 25 of silver; that examined by Klaproth 64 parts of mercury and 36 of silver; lastly, Cordier found 72.5 of mercury and 27.5 of silver in the crystallized amalgam.

The native amalgam is of rare occurrence; it has been found at Salberg in Sweden, at Rosenau and Niederslana in Hungary, at Morsfeld in the Palatinate, and principally at Moschellandsberg and Stahlberg in Deuxponts, in a yellowish and reddish ferruginous clay, mixed with other mercurial ores, and accompanied with spathose iron, lithomarge, limestone, barytes, hornstone, iron pyrites, &c.

Nothing exact is known respecting the mode of its occurrence; but probably it is confined to beds in stetz mountains.

The more solid variety resembles silver, but may easily

be known by the property it possesses of whitening gold and copper when rubbed on them.

3. *Mercurial Horn-Ore*; *Quack-silber horn-ertz*, Wern.; *Mercurie muriate*, Haüy.

Its usual colour is ash-grey, more or less deep; it often passes into yellowish-grey and greyish-white, and also inclines to greenish-grey.

It is seldom found massive or disseminated; but generally in thin crusts formed by tubercular or small globular masses, which are often composed of minute crystals. The form of these crystals is generally a dodecahedron like that of zircon, or rectangular four-sided prism, acuminate by four planes set on the lateral edges. (*Mercurie muriaté dodécaèdre*, Haüy.) Besides this the following modifications are mentioned by authors: a rectangular four-sided prism, acuminate like the preceding by four planes, but which are set on the lateral planes; a six-sided prism bevelled at both extremities, the bevelling planes set on the two largest opposite lateral planes; and the octahedron with summits and edges truncated.

These crystals are always minute and irregular, often gibbous, whence the difficulty of determining their figure with exactness. Externally they are splendid, internally splendid with a complete diamond lustre, sometimes approaching metallic lustre.

It appears to be composed of fine-grained distinct concretions. It is generally faintly translucent, sometimes only on the edges; soft; may be cut with a knife, and is easily frangible.

Its specific gravity and other characters remain yet undetermined, on account of the smallness and scarcity of the fragments that have hitherto been found.

Before the blowpipe it is volatilized, without decomposition. It is soluble in water. Woulfe found it composed of 64 parts of sulphat of mercury, and 36 muriat of mercury; Kirwan of 70 parts of mercury, and 30 of muriatic and sulphuric acids.

The Horn mercury, the scarcest of all mercurial ores, was first discovered by Mr. Woulfe in the quicksilver mines of Moschellandsberg and Morsfeld, in ferruginous clayey sand-stone, accompanied with other ores of mercury, ochrey-brown iron-stone, malachite and blue copper ore, calcareous spar, lithomarge, &c. It has also been found at Idria, generally in the cavities of an indurated clay, and of slate-clay accompanied with crystallized cinnabar; at Horzowitz in Bohemia, with dark red cinnabar in a vein of brown iron-stone, and at Almaden in Spain.

4. *Mercurial Liver-Ore*; *Quack-silber-Leberertz*, Wern.; *Liver-coloured mercurial ore*, Atk. *Mercurie sulfuré bituminifere*, Haüy.

It is divided by Werner into compact and stony liver-ore.

a. *Compact*.—Its colour is intermediate between dark lead-grey and cochineal red.

Occurs massive and rarely disseminated. Internally it is glittering and glimmering, with semi-metallic lustre.

Fracture even, passing sometimes into fine-grained uneven, and imperfect large and flat conchoidal: fragments indeterminate angular, more or less blunt-edged; opaque. Streak thinning, and of a deep cochineal red colour. It is soft, may be cut with a knife, and is easily frangible. Specif. grav. 7.186—7.352, Kirwan; 7.937, Gellert.

b. *Stony*.—Its colour nearly the same as the preceding, only now and then more of the red observable on the principal fracture. It is found only massive. Its fracture in the direction of the laminæ is curved and thick stony; it is shining, and its lustre approaches the metallic; cross fracture

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even and compact, and but little shining or only glimmering. Fragments more or less flat. It is opaque, and uncommonly easily frangible.

The mercurial liver-ore affords upwards of 80 per cent. of pure mercury. Klaproth, who analysed the compact variety from Idria, obtained the following results :

Mercury	-	-	-	818
Sulphur	-	-	-	137.50
Charcoal	-	-	-	23
Silex	-	-	-	6.50
Alumina	-	-	-	5.50
Oxyds of copper	-	-	-	2
Copper	-	-	-	0.20
Water which served to form the sulphu- rated hydrogen gas, and other loss	}			7.30
				1000

This analysis, Klaproth adds, may serve to rectify the erroneous notions which have been adopted concerning the composition of this mixed mineral. By shewing that the sulphur is combined with the metal in the same proportion as in cinnabar, namely, as 1 to 6 in round numbers, we are taught how little foundation there is for the opinion of those who, like Sage and Kirwan, think that a part only of the mercury is in the state of sulphurated mercury, and that the other is in the state of a simple oxyd. If that were the case, the non-sulphurated part would certainly be soluble in the nitric acid; but experiment shews that this is not the case, because the acid cannot dissolve any part even when boiling, the mineral powder remaining unchanged at the bottom of the vessel. See Nichol's Journ. vol. 15. p. 231.

Both varieties of mercurial liver-ore occur together at Idria in Friaul, to which they appear exclusively to belong, though Spain, Siberia, and other places have been mentioned by authors among their localities. They are found in large masses, in and with slate-clay, and a kind of bituminous shale, and accompanied with cinnabar, and sometimes small quantities of native mercury and iron pyrites. Two ores of mercury, supposed to belong to the liver-ore, are at Idria distinguished by particular names. One is the *Brand-ertz*, which appears to be a kind of coarse coal impregnated with cinnabar; the blackish-grey variety contains only from 1 to 18 per cent., the red from 30 to 40 per cent. of mercury. The other is called *Corallen-ertz*, (bead or coral-ore); it consists of reddish-black oblong beads of the size of a large coffee bean, of a foliated structure, imbedded in a blackish bituminous shale, and also in sand-stone. The richest affords about 40 per cent. of mercury.

5. *Cinnabar*; *Zinnober*, Wern; *Mercure sulfuré*, Häuy.

This species may conveniently be subdivided into two varieties, viz dark red cinnabar and bright red cinnabar.

Dark red cinnabar; *Dunkel-rother zinnober*, Wern.

Its colour is cochineal red, which in some varieties inclines on one side to carmine red, on the other to lead grey.

It is found massive, disseminated, in superficial coatings and membranes, amorphous, cellular, dendritic, and crystallized.

Its primitive form is the regular hexahedral prism; integrant molecule, the triangular equilateral prism. The following, according to Werner, Emmerling, and Eistner, are the principal secondary forms: 1. The rhomboid rather flattened, truncated in the two diagonally opposite obtuse angles.

2. The six-sided table, formed by the increase of the truncating planes of the preceding figure. 3. The regular six-sided prism, either perfect or acuminate by three planes set on the alternate lateral planes. 4. The three-sided pyramid, either double or single, in which the angles are sometimes more or less deeply truncated. 5. The regular octohedron, sometimes terminating in an edge at the summit.

Häuy, on the other hand, has observed only two distinct modifications in the crystals of cinnabar; the one is the primitive form, or the regular six-sided prism (*Mercure sulfuré primitif*, pl. 65. fig. 27.), in which the divisions parallel with the lateral planes are very distinct; the other (*Merc. sulf. bifolterne*, fig. 28.) a similar short prism, with six marginal planes at each extremity placed alternately with regard to the lateral planes and to the planes of the other extremity.

These crystals, whose real form is often difficultly determinable, are generally small and very small; they are grouped together without order, generally lining the cavities of massive cinnabar. Externally they are splendid; internally both the crystallized and amorphous varieties are shining, which sometimes passes into glistening, and likewise into glimmering; with diamond lustre approaching to semi-metallic. The foliated varieties have the strongest lustre.

Fracture either more or less perfectly lamellar, the crystalline varieties with laminae sometimes rather curved; or fine-grained uneven, with a tendency to conchoidal. Fragments indeterminate angular, rather blunt-edged. The lamellar varieties present granular distinct concretions; sometimes there is a tendency to thick and straight lamellar distinct concretions.

Massive cinnabar is opaque, seldom translucent on the edges; but the crystals are sometimes translucent and even approach transparent.

It becomes shining in the streak, affording a scarlet red powder. It is soft and easily cut with the knife, and very heavy. Spec. gr. varies from 4.500 to 10.218, which latter was determined by Briffon on a pure crystal from Almaden: 7.710, Klapr. (the Japanese in grains): 8.116, Kl. (the massive from Neumärktel).

The constituent parts of dark red cinnabar, were found by Klaproth to be

	The Japanese.	From Neumärktel.
Mercury	-	84.50
Sulphur	-	14.75
		99.25
		99.25

Bright red cinnabar; *Hoekrother zinnober*, Wern.

Colour bright scarlet red. It is found massive, disseminated, and coating. Internally it is glimmering, of rather a pearly lustre; sometimes, especially on the cross fracture, it is dull; principal fracture between earthy and fibrous; cross fracture earthy, fine-grained; fragments indeterminate angular, blunt-edged. It is opaque. Streak scarlet red, shining. It is very soft, passing into friable; and foils. It is very heavy.

This sub-species, which is much scarcer than the preceding, is found in the quicksilver mines of the Palatinate, particularly at Wolfstein and at Deuxponte, where it is accompanied with brown iron-stone, iron-ochre, quartz, calcareous spar, and dark red cinnabar. The other localities assigned to light red cinnabar are not well authenticated.

Some authors, as Eistner, are said to have mistaken the red iron-

iron-ore, which is found with bright red cinnabar, for this latter variety; whence the other shades of red they mention are not applicable to the substance in question.

Werner adopts two distinct formations of cinnabar, contemporaneous with the mountains in which they occur in beds. These latter, in the older formations, consist of a kind of chlorite slate, quartz, &c.; in the newer, of slate clay, &c. It is also found in veins, the relative age of which is not ascertained. To the newer formation, which is far more abundant than the old, belong the repositories in the Palatinate, in Deuxponts, Spain, Idria, &c.; to the older, those of Hartenstein in Saxony, of Carinthia, &c. In veins it occurs at Horowitz in Bohemia, in Lower Hungary, &c., where it is accompanied with some other mercurial ores, with iron-stone, galena, and other geognostically related species, which, in this case, are always indications of venigenous origin. When occurring in beds, it is generally accompanied (besides with other ores of mercury) with compact lime-stone, calcareous spar, barytes, quartz, and sometimes traces of copper ores; the beds themselves are principally formed by slate clay, a kind of sand-stone, and rocks of a similar nature. Some of the older beds are found in clay slate mountains, and contain the cinnabar in contemporaneous small veins or trunks. The newer beds are supposed partly to belong to the coal-formation. Mohs.

The geognostic relations of the Japanese dark red cinnabar are not known. It is brought to us in small grains, being mostly fragments of flattened six-sided prisms, which partly contain finely disseminated iron pyrites, and are also found adhering to particles of a quartz substance.

The principal quicksilver mines in the Palatinate are at the following places, *viz.* Mörsfeld, where the cinnabar traverses quartz, which is often completely coloured by it; the native quicksilver, formerly found at this place, was so abundant, that, according to Ferber, it was observed in the very streets of the town: Spitzenberg near Mörsfeld, where cinnabar occurs mixed with brown iron-stone; also small veins of asphaltum are sometimes found here in the masses of cinnabar: Carlsgrück, which furnishes a mercurial sand ore, being cinnabar in a grey fine-grained and partly slaty sand-stone, mixed with more or less clay; also native mercury has sometimes been found here included in geodes of brown iron-stone: Wolfstein, where there is the mine *Theodors Erzluft*, in a mountain called the Königberg; it was formerly uncommonly rich in mercurial ores, such as the light red cinnabar both earthy and fibrous, which is almost exclusively found here, accompanied with brown iron-stone, &c.: at Potzberg, in the principality of Veldentz, cinnabar occurs in a kind of pudding-stone.

In the territory of Deuxponts, the most remarkable mine is that in the Schloßberg of Obermoschel or Moschellandsberg, where both cinnabar and native mercury are found in great abundance.

The quicksilver mines of Idria were discovered in 1497. The richest ores, according to Ferber's account, occur in a considerable bed of clay slate. The roof and hanging side of the veins consist of limestone; they are very much rent, and traversed by dykes or ridges of other calcareous rocks and of a hard clay slate, which produce slips and faults in the mercurial vein. The clay slate of Idria is generally soft at some depth under ground, but harder and more distinctly slaty towards the surface: its principal colour is black. This slate is traversed and penetrated in all directions by veins of cinnabar and disseminated native mercury, which are also found in nests. It is in the softer part

of the slate that the richer ores are generally found; they are firm, compact, and commonly marle-like, and when unmixed with other soft earthy substances, are susceptible of polish. These richer ores contain from 40 to 70 and even 80 pounds of quicksilver in the hundred weight.

The different rock-stones at Idria containing mercury are, 1. Grey and black lime-stone, improperly called horn-stone by the miners; it constitutes only the roof and sides of the slaty vein and the bars, which latter sometimes contain much disseminated cinnabar. 2. Varieties of clay of various colours, white, grey, yellow, red, and blackish, some pure others marly, and of various degrees of hardness: the blackish-grey variety yields from five to ten *per cent.* of quicksilver. 3. Grey clay slate, either pure or mixed with lime: it contains from two to three *per cent.* of quicksilver; the more its colour increases in depth the richer it becomes, so that the darkest, or blackish-grey variety, yields sometimes eight pounds in the hundred weight. 4. Black soft clay slate, called *Mildzeug*, of a more or less marly nature, and containing from ten to fifteen, and sometimes even from thirty to forty pounds in the hundred. 5. A black hard clay slate, called *Spiegel*, or looking-glass slate, on account of its shining surface: it sometimes produces from forty to fifty pounds in the hundred weight; but very little when purely argillaceous, and very hard. 6. Druses, or aggregations of calcareous, gypseous, and barytic crystals, which are sometimes found coated with cinnabar.

The following are the principal mercurial ores known at Idria: 1. Pure cinnabar, massive and crystallized. 2. Red ore, or impure cinnabar, of a tile-red colour, mixed with marle and pyrites; producing about thirty pounds in the hundred. 3. *Schnürl-erz*, or bead-ore, because the cinnabar traverses the matrix in small veins similar to strings of beads. 4. Mercurial liver-ore, a very rich ore, yielding from fifty to eighty pounds in the hundred weight. 5. Mercurial brand ore. 6. Coral ore, which contains from one to forty pounds. *Vide supra Mercurial liver-ore.*

The Spanish quicksilver mines are the most ancient we are acquainted with. Pliny informs us that no other cinnabar was made use of at Rome than that from Spain, particularly that of the *Regio Sifaponensis* in Bætica, which appears to have been the territory of the present Almaden. This latter name is of Saracenic origin, signifying the shaft or gallery of a mine. According to Theophrastus and Pliny's account, the cinnabar brought to Rome was a kind of sand; a term which is applicable to those small fragments of cinnabar mixed with quartz, which are still found in considerable quantity in the old mine de las Cuebas, near Almaden, from the size of a hazel-nut to that of a hemp-seed.

The prevailing mountain-rock at and near Almaden is a grey clay slate, traversed in many places by considerable beds of a breccia, which is composed of pieces of a similar clay slate, with white calcareous spots, and fragments of the same black bituminous shale, which is the usual concomitant of the quicksilver mines of Almaden. This breccia is here known under the name of *Fraileque*, on account of its prevailing colour, which resembles that of the habit of the Franciscan monks.

The most important mines are at the south side of Almaden, in the immediate neighbourhood of the town; there are six of them, running, within the space of about fifty fathoms, nearly from east to west: some of them, especially that of San Diego, deviate from this course, describing part of a large circle. Their dip is from sixty to upwards of eighty degrees; they frequently intersect each other, and are also traversed by the above-mentioned breccia and a black bitu-

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minous shale; but at a certain depth (such as in the mine Francisco, which is 100 fathoms deep), they generally continue their course without interruption. They are all very rich in ore: where the veins meet, particularly those of San Julian and San Diego, the repositories of ore are from four to five fathoms in thickness: these consist of a quartz, richly intermixed with cinnabar, yielding from twenty to thirty pounds in the hundred.

The other quicksilver mines belonging to the territory of Almaden are, 1. That of Almadenejos, where veins of quartz, from one to half a fathom in thickness, richly penetrated by cinnabar, traverse the grey clay slate above-mentioned. 2. That of Guadalperal, half a Spanish league N.W. from Almadenejos: this mine, which is very superficial, was wrought by the Romans. The rock it traverses is the same clay slate with that of Almaden, only that the breccia contains no fragments of the black bituminous shale, which is one of the component parts of that seen at Almaden. The ores of this mine consist of crystalline cinnabar, mostly in very narrow veins or trunks. 3. The mine de las Cuebas, about three English miles from Almaden, in the same direction with that of Guadalperal. The quicksilver ores are here found in short interrupted veins of quartz traversing bituminous shale.

For a complete account of the quicksilver mines of Almaden, see Hoppen sack über den Bergbau in Spanien. Weimar, 1796.

MERCURY, Assay and Analysis of the Ores of.—Mercury is frequently combined with silver and bismuth in the form of an amalgam. The mercury may be separated by distillation in a retort of iron, or of glass coated with sand and clay. The residuum, which is generally silver and bismuth, may be dissolved in nitric acid. When the solution is complete, a large quantity of water must be added, by which the greatest part of the bismuth will be separated in the state of subnitrat. If oxymuriatic gas be passed through the solution of silver and the remaining bismuth, the former will be precipitated in the state of muriat of silver, while the bismuth will be held in solution in the state of oxymuriat of bismuth. When the muriat of silver is separated, the bismuth may be precipitated by potash, and the oxyd collected and dried. The subnitrat of this metal first separated must be boiled with potash, to separate the nitric acid. This oxyd, being washed and dried, may be added to the other. For every 100 of this oxyd, allow 90 of the metal. The muriat of silver contains, in the 100, 77.77 of the metal.

A specimen of the native amalgam of silver and mercury, analysed by Klaproth, gave 64 mercury and 36 silver in the 100.

Should any gold be present, it will be left undissolved when the residual metals are taken up by the nitric acid.

Native cinnabar may be analysed by dissolving it in nitro-muriatic acid. The mercury will be dissolved in the state of oxymuriat of mercury, while the sulphur will be separated. If much heat be employed, some of the sulphur will be converted into sulphuric acid, and some of the mercury, in consequence, will be thrown down in the state of sulphat: the solution, therefore, must be made in the cold.

The sulphur being separated, washed, and dried, may be weighed.

The mercury may be separated in the metallic form by a clean piece of iron. This is almost the only instance in which a metal is precipitated by another in a state of purity, since iron does not in any degree combine with mercury. The mercury may also be thrown down by the green sulphat of iron. This ore, according to Klaproth, consists of

84.5 mercury, and 14.75 sulphur. The hepatic ore may be analysed by a process similar to the last. This, however, is apt to abound with other substances besides sulphur and mercury. A specimen from Idria was analysed by Klaproth, and the result is given under the article *Ores of Mercury*, supra.

The native muriat of mercury consists of a mixture of sulphuric and muriatic combined with the oxyd of mercury. This ore must be reduced to a fine powder, and mixed with twenty-four parts of water; oxymuriatic gas must then be passed through it for a length of time, till the whole of the powder be dissolved. The sulphuric acid may be precipitated by muriat of barytes. The mercury may be precipitated from the muriatic acid by a bright piece of iron.

The sulphat by this process becomes oxyfulphat of mercury. In the ore it may be considered as the sulphat: for every 100, therefore, of sulphat of barytes precipitated, allow 211.76 of sulphat of mercury in the ore. The rest may be considered muriat of mercury. For 100 of mercury allow 4 of oxygen, and 11.2 muriatic acid.

For the assay of mercurial ores in the dry way, let the specimen be pulverized, and accurately mixed with one-fourth its weight of quicklime, and an equal portion of iron filings, and then let it be pretty strongly ignited in an iron or earthen retort, as long as any mercury comes over into the receiver.

The modes of extracting the metal from the ores of mercury are very simple. Messrs. Aikin, in their valuable Dictionary of Chemistry and Mineralogy, have given an account of the process for this purpose at the mines of Deuxponte and of Idria, and also at Almaden in Spain. The former is the best and most scientific, and it is as follows: when the ore is brought out of the mine it is accurately sorted, those pieces being rejected which appear to be destitute of metal. The sorted ore, being pulverized, is mingled with one-fifth, more or less, according to the proportion of cinnabar contained in the ore, of quicklime powdered by exposure to the air. This mixture is then put into iron retorts, about forty or fifty in number, capable of holding about 60lbs. weight, which, thus charged, are fixed in a long furnace; a glass receiver is then attached to each retort, but not luted, and a gentle fire is applied in order to expel all the moisture: when this is effected, the juncture of the vessels is closely stopped with tempered clay, and a full red heat is applied for seven or eight hours, at the expiration of which time all the mercury will have been volatilized and condensed in the receiver. The common produce varies between six and ten ounces of metal from 100lbs. of the ore.

The process at Almaden is more rude and artificial: it is described by Messrs. Aikin (*ubi supra*); and to their account of it the reader, desirous of further information, is referred.

The conveyance of mercury from place to place requires, on account of its fluidity, extraordinary precautions. It is packed in the following manner. A fresh found sheep-skin, the hair of which has been taken off, is laid over a wooden bowl, and a quantity, from 50lbs. to 75lbs. of mercury is poured into it: the ends of the skin are then gathered up, and tied together with great care, thus forming a sort of bag in which the metal is inclosed: this bag is inclosed in a second skin, and the second in a third: and, lastly, these bags are put into very tight barrels, capable of holding from two to four of them, and in this state are brought into the market.

Chemical and Physical Properties of Mercury.—It is a white

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white metal resembling tin. Its specific gravity is 13.568. It is liquid at the greatest cold of this climate, but becomes solid at -39° , or 71° below the freezing point of water. It has frequently been reduced to the solid form in this country by the aid of freezing mixtures, and lately, by Mr. Letley, in the vacuum of the air-pump. In this state it possesses some of the characters of tin, as far as regards its appearance and malleability. It is said to undergo a rapid decrease of volume immediately before congelation, a property the reverse of what is observed in the freezing of water; and in the congelation of all bodies, the liquids of which are of greater specific gravity than their solids, will it not be found that solid mercury is of greater specific gravity than the liquid? The boiling point of mercury, or the temperature at which it assumes the elastic form, is 650° , or, as some say, 660° ; so that the number of degrees between its freezing and boiling points is 689° , or 699° . This property admits of its being distilled, which furnishes a simple method of separating it from substances which are not volatile. Hence we may conclude, that if our natural temperature were more than 650° , mercury would be presented to us in the form of a permanently elastic fluid: while, in a temperature less than -39° , it would be a solid malleable metal.

Mercury does not decompose water at any temperature, and hence it may be kept under that fluid without undergoing any change.

When exposed to the air it soon tarnishes, and becomes covered with a dark grey powder. If it be agitated with the fingers for a short time, they become soiled with the same powder. This substance is produced by the mercury combining with the oxygen of the atmosphere. It may be formed in greater quantity by a stronger agitation in contact with oxygen. This has been effected by putting a small quantity of mercury into a large bottle, and tying it to the spoke of a coach-wheel. The change of surface, from the motion of the wheel, induces the rapid oxydation of the mercury. The oxyd so obtained is the first or protoxyd of mercury, and was called by the old chemists *Ethiops per se*. If, according to Dalton, the atom of mercury be 167, hydrogen being 1, and oxygen 7, the protoxyd will be $\frac{167 \times 7}{7}$

$= \frac{100}{4}$, or four per cent. This is exactly what Fourcroy

makes it by experiment. In taking a general view of the combinations of mercury with other bodies, it would appear that Mr. Dalton has rated the atom of mercury too high. The analysis of the sulphuret appears to be the most perfect. It may with much confidence be admitted, that 85 of mercury combines with 15 of sulphur for the second

sulphuret. Hence we shall have $\frac{15}{85} = \frac{26}{147\frac{1}{2}}$. We

shall find, therefore, in treating of the other compounds, that it will be nearer the truth, to call the atom of mercury 147. This number will give the protoxyd 4.5 per cent. When mercury is dissolved in nitric acid with a boiling heat, and the oxyd precipitated by lime water, the precipitate will be formed of a yellow colour. This is in all probability the second

oxyd, which should be constituted as follows: $\frac{147 + 14}{14}$

$= \frac{100}{8.7}$, or 8.7 oxygen, and 81.3 mercury. Chenevix

makes it 10.7. It is likely, however, that as he expelled the acid by heat, the oxyd might absorb more oxygen, or the acid might not be all driven off.

The third oxyd of mercury may be formed by exposing the metal or the protoxyd in small quantity in a large glass matras, the neck being drawn out to a small point. When the mercury is heated in this vessel to a boiling heat, 650° , the smallness of the aperture does not admit of its escape as vapour, while it is completely exposed to the oxygen of the atmospheric air. By this means the mercury becomes converted into a red powder, which is the third oxyd. The same may also be procured by adding lime-water to a solution of the oxyduret of mercury (corrosive sublimate), when a beautiful red powder is precipitated, which is the oxyd in question. The proportions will be $\frac{147 + 21}{21} = \frac{100}{12.5}$ or 87.5 mercury, and 12.5 oxygen.

This oxyd is of a beautiful red colour: it possesses some of the qualities of an acid, inasmuch as it has a decided taste, is corrosive to the skin, and when heated with filings of tin or zinc, it causes them to inflame by yielding with facility its oxygen to them. Chenevix makes the proportions to be 85 mercury and 15 of oxygen, but for the reasons given in the second oxyd it is, doubtless, rated too high.

Mercury does not combine with carbon, hydrogen, or nitrogen, but it combines with sulphur and phosphorus.

When two parts of sulphur and one of mercury are rubbed together in a mortar, the mercury combines with a portion of sulphur. The whole mass appears of a black colour, and consists of the sulphuret of mercury mixed with an excess of sulphur. This substance was formerly called *Ethiops mineral*. If this mass be exposed to a heat sufficient to sublime the sulphur, the excess of the latter substance escapes, leaving behind a substance of a deep violet colour. If this heat be continued the sulphuret is sublimed, which, if collected by a proper vessel, will form a red cake, which, when reduced to powder and washed, constitutes the factitious cinnabar, known in the arts by the name of *Vermilion*. There appears to be two sulphurets of mercury, viz. cinnabar, and one containing less sulphur. The first will consist of 8 of sulphur and 92 of mercury, for $\frac{147 + 13}{13} = \frac{100}{7.1}$. The second sulphuret consists

of 15 sulphur and 85 mercury, from what has been before stated. The second sulphuret of mercury has a beautiful scarlet colour, for which it is esteemed in the arts as a pigment: it does not dissolve in water and is perfectly tasteless. It does not change on exposure to the air. When exposed to a strong heat the sulphur combines with oxygen, and burns with a blue flame. Iron has a stronger attraction for sulphur than mercury. Hence, if the red sulphuret be mixed with iron filings and introduced into a retort, the iron combines with the sulphur, and if the heat be sufficiently raised, the mercury comes over in a state of tolerable purity. This method is employed in the large way to separate mercury from native cinnabar.

A method of preparing artificial cinnabar has been discovered by Mr. Kirchoff. To 300 grains of mercury add 68 grains of sulphur, which being moistened with a solution of potash, must be rubbed together in a mortar which is not of metal. By this means the ethiops mineral is produced. To this substance 160 grains of potash, dissolved in its own weight of water, must be added. Let the mass now be transferred into a porcelain dish and heated over a chemical lamp, adding water from time to time to supply the loss by evaporation, in order to keep the solid ingredients covered.

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covered. During this process it should be constantly triturated with a glass pestil. At the end of two hours the colour will begin to change from black to brown, and soon passes through different shades to a red. As the mass assumes the form of jelly, the red colour increases in brightness, and soon acquires its maximum of tint, at which time it will be proper to withdraw the heat, otherwise the colour declines to a dirty brown. It is recommended, that after it has acquired a tolerable good colour, it should be exposed for a few days to a low and uniform temperature, by which means the colour gradually improves and ultimately becomes exquisite. If the cinnabar thus obtained be exposed to a strong heat, it becomes brown and ultimately of a violet colour. It is highly probable, that this violet-coloured sulphuret is the first sulphuret produced from the second, from some of the sulphur being volatilized.

Phosphorus does not easily combine with mercury. Pelletier, however, succeeded in uniting these bodies by distilling a mixture of red oxyd of mercury and phosphorus. He observed that the red oxyd assumed a black colour before it combined with the phosphorus. Dr. Thomson, partly from this fact and from his own experience, is of opinion, that it is not the metal which unites with the phosphorus, but the black oxyd. In reasoning from analogy we might be apt to doubt this fact. We know that when sulphur is heated with an oxyd of mercury, the oxygen of the latter combines with a portion of sulphur, and is carried off in the state of sulphurous acid gas. Then since phosphorus has a stronger attraction for oxygen than sulphur, it would seem likely that the mercury would be reduced to its metallic form before it combined with the phosphorus. This, however, is not a fair conclusion, since none of the compounds of phosphorus are volatile. The circumstance of sulphurous acid being elastic, is doubtless a strong reason why the metals in the metallic sulphurets are generally free from oxygen.

The phosphuret above alluded to is a solid of a black colour: its consistency is such as to be cut with a knife. When exposed to the air it exhales a vapour smelling like phosphorus.

Mercury combines with most of the metals forming alloys, which have been called amalgams. Many of these compounds are of great use in the arts.

Gold unites with mercury with such facility, that if a piece of pure gold be singly dipped into it, it comes out completely covered with mercury. When the gold is divided into small grains and heated red-hot, the mercury being heated near to its boiling point, the gold almost instantly dissolves. A considerable proportion of gold may be added in this way without materially altering its liquidity. If, however, this liquid amalgam be squeezed through sheep's leather, an alloy will be obtained of almost any degree of consistency. The amalgam of gold used for gilding is about the consistency of paste. The substance to be gilt, which is copper, brass, or silver, is first covered with mercury, in order to form a medium for covering the surface with the amalgam. When the surface of silver is clean, the mercury combines with it with great facility. Copper or brass do not take the mercury by the same mode of application. A dilute nitric acid is added to the mercury, by which a portion of the metal is dissolved. If a small quantity of this solution be applied to the brass or copper surface, the mercury becomes precipitated upon it, and is instantly made fit to receive the amalgam. A small quantity of the amalgam, more or less, according to the thickness of the gilding required, is laid upon the quicksilver surface, and

uniformly spread about with a brush. The substance is then held over a clean coke or charcoal fire, and thus alternately heated and brushed till all the mercury is evaporated, leaving the gold firmly and uniformly adhering to the surface.

Mercury does not combine easily with platina in masses. If, however, the precipitate from nitromuriatic acid by muriat of ammonia be exposed to a strong heat, the acid and oxygen are expelled, leaving pure platina in a state of minute division. If the mercury be mixed with this powder and heat applied, an alloy will be formed, from which an amalgam of any degree of consistency may be obtained by squeezing through leather. This amalgam may be employed for coating metals, such as silver, brass, and copper. The metallic precipitate of platina above-mentioned, might be obtained at little expence, probably not more than the price of silver. Vessels of copper might, therefore, be covered with platina without much increasing their intrinsic value.

We hope, therefore, that artists in this line will take the hint. Even if no other end should be gained than preventing the deleterious effects of copper, the object is worth attention.

Silver easily amalgamates with mercury. When the proportion is eight of mercury to one of silver, the mass is capable of assuming a crystalline form. The specific gravity of this compound is greater than an arithmetical mean, a proof of considerable affinity between the two metals. This amalgam, like the two last, may be employed to coat copper and brass with silver.

Copper is capable of combining with mercury. The alloy, however, is not of any use, and has been little examined.

Mercury does not combine with iron. This circumstance presents many advantages. Iron vessels are well calculated for conveying mercury from place to place, and iron retorts are well fitted for distilling that substance. There are some disadvantages in mercury not uniting with iron. If the surface of iron could be covered with mercury like copper, &c. it might be gilt with as much facility as those metals. Although it is generally considered as incapable of uniting with mercury, it is stated in Crell's Journal, that Mr. Vogel has succeeded by the following process. Take half an ounce of iron filings and one ounce of alum, and rub them together to a very fine powder; add to this from an ounce to an ounce and a half of mercury, and triturate till the amalgam begins to be formed; then pour in a little water, and continue the agitation for an hour: the alum is now to be dissolved out and the amalgam of iron will remain behind.

Tin combines easily with mercury. It is this alloy which constitutes the silvering of glass reflectors. A piece of tin-foil is first cut to the size of the glass plate to be silvered. This sheet is spread upon a smooth and perfectly flat stone, at first truly horizontal, but capable of being placed in an inclined position. The sheet of tin-foil is then covered with mercury, till the whole of the surface appears perfectly bright and liquid. The plate of glass, perfectly clean, is then laid upon the tin-foil. A number of weights are also laid upon the glass-plate, and the stone put into an inclined position by a lever, and held in that situation by temporary props. By this means the excess of mercury is squeezed out, and runs off by a groove in the edge of the stone. As much mercury is left with the tin-foil as will form a tolerably hard alloy.

Mercury unites with zinc in any proportion. This alloy is employed in a friable state for the purpose of laying on the

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the cushions of electric machines, which much increases their exciting power.

It is also employed in the process called *filioring*. An amalgam of the consistency of that used for gilding is applied, in a manner similar to the gilding amalgam, to the surface of copper. The mercury evaporates by heat, leaving the zinc behind. The latter, however, does not appear in its pure state, but combines a portion of copper, and by that means produces a fine yellow surface, little inferior to gold, but in fact it is nothing more than brass formed by the union of the copper with the zinc. This process is employed by the button-makers. Some sorts of buttons are first covered all over with this yellow coating. The upper surface of the button is afterwards really gilt.

Mercury is readily alloyed with lead, bismuth, and antimony: the second of these is frequently used to adulterate mercury. It may contain a considerable portion of bismuth without sensibly losing its liquidity.

Salts of Mercury.—The salts of mercury are generally distinguished by their nauseous taste. Those that constitute the greatest part are insoluble in water. They form several varieties from the oxyd of mercury, assuming different states of oxydation, and also from their aptness to exist in the state of sub and super-salts.

Sulphat of Mercury.—Sulphuric acid does not act upon mercury without the assistance of heat. The acid is then partly decomposed. An atom of oxygen is separated, which combines with the mercury. The acid flies off in the state of sulphurous acid. Indeed this is the best way of getting this gaseous acid in a state of purity. The oxyd of mercury unites with another portion of the acid, forming the sulphat of mercury which separates in the form of white powder. In this experiment the sulphuric acid should not be in excess, since in that case the super-sulphat of mercury would be obtained. This salt dissolves in 500 parts of water at 60°, and in 287 at 212°. On evaporation it affords small prismatic crystals. It is not changed by exposure to the air, but is decomposable by heat. According to the analysis of Foureroy, it is composed of 12 acid, 83 of the second oxyd of mercury, and 5 water. If we consider the atom of mercury 147, oxygen 7, and sulphuric acid 34, the atom of the second oxyd will be $147 + 2 \times 7 = 161$: then for the sulphat we have $\frac{161 + 34}{34} = \frac{100}{17.4}$, or 17.4 acid, and 82.6 of the second oxyd of mercury.

Super-sulphat of Mercury.—When an excess of sulphuric acid is boiled upon mercury, the oxyd combines with two atoms of acid, constituting the super-sulphat of mercury. It has a disagreeable acrid taste. It is not changed by exposure to the air. It changes vegetable blues to red. Foureroy says that when the acid amounts to $\frac{1}{2}$ th of its weight, it is soluble in 157 of cold, and 33 of boiling water, and observes that it is differently soluble with different proportions of acid. This is the first instance in which we have heard of the acid of a salt being so unlimited, and we cannot help doubting the accuracy of the above fact. In all the instances in which super-salts have been analysed, they have been found to contain a double dose of acid. Considering it therefore as such, we have $\frac{161 + 2 \times 34}{2 \times 34} =$

$\frac{100}{29.7}$, or 29.7 acid, and 70.3 base.

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Super-oxyfulphat of Mercury.—This salt is described by Dr. Thomson as the oxyfulphat, but the proportion of acid given by the analysis of Messrs. Braucamp and Sigueira-Oliva, shews it to be a super-salt. When mercury is boiled with an excess of acid, and the heat continued longer than in the formation of the last salt, some of the excess is decomposed, giving another atom of oxygen to the mercury, while sulphurous acid gas is disengaged. The oxyd, therefore, combines with an excess of oxygen, and then this oxyd combines with an excess of acid, which constitutes the super-oxyfulphat. This salt is sparingly soluble in water, and affords small crystals of the shape of prisms.

According to the chemists above-named, it is composed of 31.8 acid, and 63.8 peroxyd, and 4.4 water. According to hypothesis it will consist as follows: $\frac{168 + 68}{78} =$

$\frac{100}{28.0}$, which gives 28.0 acid, and 71.1 peroxyd.

Oxyfulphat of Mercury.—The salt which has been called *Turbith mineral*, has been supposed to be a sub-oxyfulphat of mercury. If, however, we can depend upon the analysis of Braucamp and Sigueira-Oliva, we can only consider it an oxyfulphat. It is in the state of a yellow powder, and was formerly much used in medicine. It has, however, been laid aside on account of its extreme severity of operation. According to the above chemists it is composed of 15 acid, 84.7 peroxyd, and 0.3 water. If we consider it

as a sulphat, we shall have $\frac{168 + 34}{34} = \frac{100}{16.8}$, which

gives 16.8 acid, and 83.2 of the peroxyd. If such a salt exists as the sub-oxyfulphat, it will be found to consist

of 9.2 acid, and 90.8 peroxyd; for $\frac{168 \times 2 + 34}{34} =$

$\frac{100}{9.2}$. It does not appear likely that such a mistake could

be made in an analysis. The difference between the sub and the neutral salt is nearly six per cent of acid. It may, therefore, with some confidence be concluded, that *Turbith mineral* is the oxyfulphat of mercury, and not a sub-salt, as has been supposed.

Nitrat of Mercury.—When nitric acid of a mean strength is poured upon mercury, a brisk effervescence ensues, induced by the disengagement of nitrous gas. When the acid is much diluted, and the mixture kept cool by placing the vessel in a large mass of cold water, the solution goes on very slowly. By this means every atom of mercury decomposes an atom of nitric acid, taking an atom of oxygen, by which an atom of nitrous gas is evolved. The atom of oxyd so found unites with two atoms more of nitric acid, forming the salt in question. It will be proper to observe here, that there is a seeming anomaly as well in this as in most of the soluble nitrats, and in a great number of carbonats. Although we call them indiscriminately nitrats and carbonats, they are, strictly speaking, super-nitrats and super-carbonats. We may almost generally conclude, that those salts which have been called nitrats are super-nitrats; while those which have been denominated sub-nitrats will prove, on analysis, to be nitrats simply. We cannot, however, at present make this distinction without some further experiments.

When the above solution is carried to a certain extent, or the dilute solution evaporated, the salt very easily affords

T t crystals,

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crystals, which are in the form of four-sided pyramids, base to base.

When sulphuretted hydrogen is passed through a solution of nitrat of mercury, the hydrogen combines with the oxygen of the mercury, forming water, while the sulphur combines with the mercury, and falls down in the form of sulphuret.

A solution of muriat of tin added to this salt precipitates the mercury by combining with its oxygen. The crystals of nitrat of mercury detonate upon burning coals, and explode with phosphorus by the blow of a hammer. No analysis of this salt has been given by chemists, but from the weight of its constituent atoms it will be as follows:

$\frac{147 + 7 + 2 \times 19}{2 \times 19} = \frac{100}{19.3}$; which gives 19.3 of acid, and 80.7 of the protoxyd.

Oxynitrat of Mercury.—When mercury is dissolved in nitric acid with the assistance of heat, an atom of mercury decomposes two atoms of the acid, while two other atoms of acid unite with the oxyd so formed, constituting what is called the oxynitrat, but which is in fact a super-oxynitrat. If this action goes on with a little water the salt soon forms into a yellow crystalline mass, which shews a marked difference in the character of the two salts, arising from the base of this salt having a larger proportion of oxygen. If water be added in considerable quantity to the solution of this salt, a portion of it loses one atom of acid, and is converted into a yellowish powder, which falls to the bottom of the vessel. This has been improperly called a sub-oxynitrat. From the analysis it appears to be a nitrat.

On passing sulphuretted hydrogen gas through a solution of the oxynitrat, it becomes reduced to the nitrat, and is said, by Zaboada, to combine with sulphur. It is more likely, however, that the sulphur would be converted into sulphuric acid, and that the precipitate is a sulphat of mercury. When muriat of tin is added to a solution of this salt, instead of reducing it to the metallic form, which is the case with the nitrat, it reduces it merely to the state of the protoxyd, which combines with the muriatic acid to form muriat of mercury. Its components will be known from

the following analogy: $\frac{161 + 38}{38} = \frac{100}{19.1}$, which gives 19.1 of acid, and 80.9 of the second oxyd.

The salt which has been called sub-oxynitrat, but which from its analysis must be the oxynitrat, was formerly called *nitrous turbid*, from its resemblance to the sulphat. It has been analysed by Messrs. Braumcamp and Sigueira-Oliva, who make it to consist of 12 acid, and 88 second oxyd.

By treating this salt, as the oxynitrat simply, we shall see that the proportions by hypothesis agree nearly with the above analysis: for $\frac{161 + 19}{19} = \frac{100}{10.5}$, or 10.5 acid, and 89.5 of the second oxyd.

Besides the oxynitrat already described, which contains the second oxyd, a salt may be formed with the third oxyd, so that we have three salts formed with the three oxyds; namely, the nitrat, the oxynitrat, and, for the sake of distinction, the last might be called the hyper-oxynitrat. This last salt cannot be formed by boiling the nitric acid with mercury, but by directly dissolving the third oxyd in nitric acid. Muriat of soda causes no precipitation from a solution of this salt, since the oxyd is at a maximum of oxydation, and is all employed in forming the super-oxymuriat.

Muriat of Mercury.—Muriatic acid has no action upon mercury, but readily combines with its oxyds, forming with the first a muriat of mercury, and with the third or peroxyd an oxymuriat, or rather, as we shall shew, a super-oxymuriat. The old method of making the muriat was by triturating four parts of the oxymuriat with three parts of metallic mercury, till the latter totally disappeared. By this process the peroxyd in the oxymuriat gives up as much oxygen to the metal as makes the whole into the protoxyd, which, with the excess of acid in the oxymuriat, forms the whole into a simple muriat. The mass so produced is put into a matras capable of holding about four times the quantity of matter which is put into it. This being set in a sand bath, and the heat raised, the muriat of mercury sublimes into the upper part of the matras. The vessel is now broken, and the sublimed matter carefully selected. This, however, is frequently mixed with a little of the oxymuriat, which is to be separated by repeated sublimations, or by washing in water, the oxymuriat being soluble while the muriat is not so. It would appear that this method was invented long before the component parts of the salts were known. The metallic mercury added to the oxymuriat is much too little. If we consider the oxyd in the muriat as being the protoxyd, the metal ought to be to the oxymuriat as 294 to 212. If the running mercury were less there would be an excess of oxymuriat. This experiment is very important in shewing that the oxyd of mercury in the muriat is the protoxyd. If it were the second oxyd, 212 parts of the oxymuriat ought only to take up 73.5 of running mercury. The above process, however, shews that 212 of the oxymuriat takes up 159 of mercury, and still some of the oxy salt is found in excess after sublimation. Although in this process 212 parts of the oxymuriat, by trituration with 294 of mercury, would form 462 of the protoxyd; the acid in the oxymuriat will not be sufficient to form the whole into a muriat. The acid in 212 parts of the oxymuriat is 44, which will combine with 308 of the protoxyd, to form 352 of the muriat. This quantity ought to be sublimed, leaving behind 154 of the protoxyd. If, instead of employing 212 of the oxymuriat to 294 of mercury, we make their proportions as 212 to 192, we should get 352 parts of the muriat, as before; but the residuum will consist of 52 parts of the peroxyd. The Edinburgh form for calomel, or muriat of mercury, is four parts of corrosive sublimate (oxymuriat of mercury) to 3.5 of running mercury.

In the above proportions of 212 to 192, in which the residuum is 52 of peroxyd, the proportions reduced to their lowest terms, are 4 to 3.6; for $\frac{212}{192} = \frac{4}{3.6}$. If, however, this process were carried on with the greatest economy, 212 parts of the oxymuriat should be triturated with 294 of mercury, and 22 of real muriatic acid. The whole of the matter will, in this case, be sublimed in the state of muriat, which will be 528 parts, while in the common way only 352 of this salt is obtained.

Muriat of mercury may be formed in the humid way with much more convenience, and probably cheaper. This process was first proposed by Scheele. He dissolved the mercury in nitric acid, with heat, and then added to the solution a solution of muriat of soda. A precipitate was formed, which, when well washed with hot water, was the muriat of mercury, which has been called by the names of *calomel* and *mercurius dulcis*.

This process has been much improved by dissolving the mercury in a dilute nitric acid, without heat. In Scheele's process

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process the mercury was converted into the second oxyd, which, when the muriat of soda was added, about three-fourths of the muriat were formed, and one-fourth of oxymuriat of mercury. By dissolving the mercury slowly, nothing but the protoxyd is formed, and not the least proportion of oxymuriat will be left in the solution, after the muriat is precipitated.

The oxyd of mercury in the muriat, as we have before shewn, is the protoxyd, that of oxymuriat being the peroxyd; but the oxyd of the oxynitrat is, in all probability, the second oxyd. It will appear, therefore, from theory, and experience confirms it, that one part of the second oxyd in the nitrat gives up an atom of oxygen to the other part, and thus dividing the resulting salts into muriat and oxymuriat, the former being precipitated, while the latter remains dissolved in the liquid. This idea is strongly confirmed by experiment. If lime-water be added to the oxynitrat a yellow oxyd is precipitated, which is the second oxyd. If lime-water be added to the muriat precipitated from the oxynitrat, the black or first oxyd is obtained; but if the same be added to the liquor from whence the muriat has been precipitated, the red or third oxyd will fall down. If the mercury be dissolved in dilute nitric acid in the cold, the simple nitrat will always be formed, in which the oxyd is a protoxyd. The whole of this oxyd will combine with the muriat, when the muriat of soda is added to form the muriat of mercury. This is by far the most simple and safe process for making calomel. If the mercury be dissolved with heat, the oxyd of the nitrat will be the second oxyd, which constitutes the oxynitrat. When muriat of soda is added to this, one-half of the mercury combines with an extra atom of oxygen, at the same time the other loses an atom, reducing one-half to the protoxyd, and the other to the peroxyd; the former combines with the muriatic acid to form muriat of mercury, the other combines with another portion of acid to form the oxymuriat. This latter salt is then divided into a super and a salt, the former remaining in solution, the latter falling down with the muriat. Hence it will appear, that when the oxynitrat is used, we do not obtain a pure muriat. An improved method of subliming calomel has been invented, which may be considered a valuable discovery. Instead of subliming it into a cake, as in the old way, it is sublimed into water. By this means the salt is completely freed from any soluble matter. The muriat of mercury, when pure, is in the state of white powder. It is nearly insoluble in water, requiring 1152 parts of boiling water to dissolve 1 of this salt. By exposure to the air it becomes of a deeper colour. It sublimes at a heat less than that required to sublime the oxymuriat. Hence it happens, that the latter salt is always attached to the under side of the sublimed cake of the former, when the two salts are sublimed together. This affords the means of their separation, by detaching the oxymuriat and subliming again. When the muriat is mixed with water, and oxymuriatic gas passes through it, it is converted into oxymuriat of mercury. Nitric acid dissolves it with the disengagement of nitrous gas. The result becomes a mixture of oxymuriat and oxynitrat. The last fact furnishes an easy method of analysing the salt, and has been taken advantage of by Chenevix and Zaboada. When it is dissolved in nitric acid, nitrat of silver precipitates the muriatic acid. The former chemist by this means found 100 parts of the salt or calomel to consist of 11.5 parts of muriatic acid, and 88.5 protoxyd, or 79 of mercury, and 9.5 of oxygen. The latter chemist, from 100 grains of the salt, obtained 10.6 of acid; he then precipitated the mercury with muriat of tin, which amounted to 85 grains: the rest was oxygen, which was 5 per cent., very nearly agreeing with

that above given, which was 4.5 per cent. By the latter, therefore, we have 105 muriatic acid, and 89.5 of protoxyd of mercury. By hypothesis $\frac{147 + 7 + 22}{22} = \frac{100}{12.5}$. This gives 12.5 muriatic acid, and 87.5 of protoxyd.

Calomel nine times sublimed forms what some have called the "Mercurial Panacea."

Oxymuriat of Mercury—This salt is generally known by the name of *corrosive sublimate*. It has long been known for its dreadful effects on the animal system when taken on the stomach in too large a quantity, and as a medicine in moderate doses. It was understood by the alchemists, and has been tolerably well described by Albertus Magnus.

A great variety of processes has been invented for preparing it, most of which are complicated and uncertain. We shall, therefore, give the direct method only, which is simple and economical.

We have seen in the formation of the muriat of mercury, by triturating it with running mercury, that if the oxymuriat had not an extra dose of acid, as well as an extra dose of oxygen, the proportion of acid in the oxymuriat ought to be less than that in the muriat, because no addition of acid is employed with the running mercury. We must consider the salt in question, therefore, not as the oxymuriat of mercury, but the super-oxymuriat. It was some time ago assumed by Gay Lussac, as a principle, that in all salts in which the bases combined with an extra dose of oxygen, the acid was increased in a proportionate degree. The present salt and some others seem to countenance such an opinion, but the principle is far from being general. We have many instances of super-salts without an increase of oxygen in the base. There are also oxy-salts without an increase of acid. In the oxy-sulphats of mercury above treated, one of them has merely an excess of oxygen in the base of the salt. The other has both an excess of oxygen and an excess of acid, the first being a sulphat, and the second a super-oxy-sulphat. The oxy-sulphat of iron has no extra dose of acid; since the nitric acid alone, when too great a heat is not applied, is sufficient to convert the green sulphat into the red or oxy-sulphat. This salt, however, is frequently resolved into two distinct salts, *viz.* the super-oxy-sulphat and a sub-salt, a proof that an excess of base is as common to the oxy-salts as an excess of acid. The oxymuriat of mercury may be prepared by directly adding muriatic acid to the red or peroxyd of mercury. The solution affords crystals by evaporation. It may also be formed by passing oxymuriatic gas through a solution of the nitrat of mercury, or through a mixture of water with any of the oxyds of mercury, and then evaporating the solution to obtain the salt in crystals. In making the muriat by adding muriat of soda to the solution of oxynitrat of mercury, it has been shewn that the second oxyd is divided into the protoxyd and the peroxyd, the former combining with one atom of acid, forming the muriat, which falls down; the other portion combining with two atoms of acid, forming the salt in question, and remaining dissolved in the liquid. It would appear that this latter salt could not be formed if an excess of muriatic acid were not present, in order to give to the oxymuriat its double dose of acid. The solution of mercury in the nitric acid has generally an excess of acid, which disengages muriatic acid from the muriat of soda, to make up for this demand. It would be worth while to make the experiment with a saturated solution of nitrat of mercury, and with a neutral solution of muriat of soda. Would an oxymuriat of mercury, strictly speaking, be formed? Or would this salt be resolved into a sub-oxymuriat of mercury, and a super-oxymuriat? Experiment must decide.

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side this point. The oxymuriat of mercury has generally been employed in medicine and the arts in the state after sublimation. It is then a white semitransparent mass in needle-formed prismatic crystals. Its aggregation is very great, on which account it is scarcely soluble in cold water. If, however, it be rubbed in a mortar with boiling water, it dissolves nearly $\frac{1}{3}$ d of its weight. When cold, however, it does not retain more than $\frac{1}{7}$ th. The oxymuriat, therefore, made by sublimation, should not be attempted to be dissolved in cold water, because of its great aggregation.

When this salt is formed by evaporation, or when its crystals are formed in the humid way, it is more to be depended upon. These crystals will immediately dissolve in three or four parts of boiling water, and in about 20 of cold water. The form of the humid crystals is that of quadrangular prisms, rather rhomboidal. An analysis of this salt has been made by Chenevix, by Zaboada, and by Messrs. Braumcamp and Sigueira Oliva. The first makes it

18	Muriatic acid
82	Peroxyd, <i>i. e.</i> 69.7 mercury, and
—	12.3 oxygen.
100	

The second	19.5	Acid
	80.5	Peroxyd
	—	
	100	

The latter	18.8	Acid
	81.2	Peroxyd
	—	
	100	

We shall see from the following calculation, that this salt is super-oxymuriat of mercury; the acid 2×22 , the oxygen 3×7 , and the mercury 147; $\frac{147 + 21 + 44}{44} = \frac{100}{20.7}$, which gives 20.7 acid, and 79.3 of peroxyd.

The neutral oxysulphat would be $\frac{147 + 21 + 22}{22} = \frac{100}{11.6}$, or 11.6 acid, and 88.4 of peroxyd; so that the near agreement in the above analysis, and their great difference from this last state, leave no doubt of the salt in question being a super-salt.

It is frequently a matter of much importance to be able to detect the presence of this salt, particularly when it has been administered as a poison. The life of an individual sometimes depends upon the result of a chemical test, many of which are very ambiguous. How very necessary, therefore, it is to be able to detect the presence of very small portions of this substance by some method which will be so simple and certain as to be used by any individual. We shall here give the common methods which have been recommended by different chemists.

If the fluid containing the corrosive sublimate be colourless and clear, such as water, sulphuretted hydrogen gas passed through the fluid will change it to first a yellow colour, which gets deeper, and if the quantity of sublimate be considerable, it will become black. This gas may be obtained as follows. Heat a bar of iron to a bright red, and rub the

heated part with a roll of sulphur. A sulphuret of iron will be formed, which will fall off in drops. Let this substance be put into a common phial, to which a cork must be fitted, through which is passed a bended glass tube. Then to one part of the sulphuret of iron add one of sulphuric acid, and five of water. Insert the cork with its tube as quick as possible, and let the gas which escapes pass through the fluid supposed to contain the sublimate, which, if that substance be present, will change colour in a few minutes. It must be observed, that the same gas would give a yellow colour if the fluid contained arsenic. The latter, however, is more of a golden yellow, and remains permanent, while the former changes to a dark brown. Pure potash or lime water is an excellent test for the oxymuriat of mercury. When solutions of the above substances are dropped into a fluid containing the smallest portion of corrosive sublimate, the potash produces a bright orange coloured precipitate, which is the peroxyd of mercury. The lime water produces a similar precipitate, but rather more inclining to a brick-red colour.

A very sensible test for corrosive sublimate was some time ago proposed by Dr. Bostock of Liverpool, which was the muriat of tin. When a few drops of a solution of tin in muriatic acid are added to any fluid containing the smallest portion of oxymuriat of mercury, a very conspicuous milky whiteness instantly appears. This is occasioned by the oxyd of tin seizing the excess of oxygen in the oxymuriat of mercury, by which a quantity of the oxyd of tin, or rather, perhaps, the submuriat, is instantly set free, and at the same time the oxymuriat of mercury is converted into muriat, which is also precipitated. Hence this very conspicuous phenomenon arises from the joint precipitation of the above substances. Sensible as this may be, it is not to be relied upon, except in the hands of very accurate observers. When muriat of tin is dropped in water, it becomes milky by the precipitation of the submuriat of tin, even where no corrosive sublimate is present. Hence, if more water be present with the suspected matter, than will be calculated to keep the tin suspended, the result will be ambiguous and uncertain.

From what has been said of the properties of this salt, it will appear that any substance will form a test of salt which will either precipitate the oxyd, or deprive it of some of its oxygen. In the first case the high coloured red oxyd becomes very conspicuous: in the second, the oxymuriat of mercury is reduced to the state of muriat, which renders the fluid turbid and milky, from the insolubility of the latter substance.

The most satisfactory appearance of the presence of corrosive sublimate would be the mercury itself, since this salt is the only soluble muriat to be purchased in the shops. If the mercury be made to appear in its metallic state, it may almost be deemed impossible for it to have originated from any other substance than the oxymuriat of mercury. Fortunately we have it in our power to recommend a method to the public which will answer this purpose completely. It is so simple as to be practised by any person unacquainted with chemistry, and it is so sensible, at the same time, that it is impossible to say how minute a quantity of mercury can be detached.

It is founded upon the principle by which the precipitation of one metal by another, under the influence of electricity, takes place. In order to make the apparatus as simple as possible, we shall use, in lieu of a piece of gold wire, a common wedding ring, and when a piece of zinc wire cannot be had, a piece of iron wire will do very well. Let the zinc or iron wire be bent into the shape of a parallelogram about two inches long, and about the width of the gold ring. Let this consist of three sides, two long sides and one short side,

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side, that it may have the appearance of a fork or a flaple. Tye the ends of the wire to the ring with a bit of thread, so that the same may be opposite to each other, separated by the diameter of the ring. When this is done, the ring and the wire, when laid upon a flat surface, will touch the surface in two places; the ring in one place, and the short side of the parallelogram in another, the touching points being about two inches distant: then take a flat piece of window glass, or a small looking glass, and lay it in a horizontal position, so that any liquid dropped upon it may not run to any side. This being done, prepare a small quantity of dilute sulphuric or muriatic acid, about four of water to one of acid, and also get some of the liquid supposed to contain the corrosive sublimate. Let the dilute acid be dropped upon the plate, till it spreads to the breadth of about one inch and a half. Then, at about half an inch distance from it, let the suspected liquid be dropped, till the peripheries of the two circles join. After this, let the apparatus above described be so laid, that the iron wire may touch the dilute acid, and the gold ring the other liquid. If the latter contain corrosive sublimate, the ring will become covered with mercury on the part which touches the liquid. This appearance will be sooner in taking place, as the quantity of corrosive sublimate is greater. When the liquid contains two parts of this substance, the mercury will be very perceptible upon the ring in five minutes from the time of the connection being made.

Mr. Chenevix, in ascertaining that corrosive sublimate was not oxymuriat of mercury, but merely muriat of mercury highly oxydated, has discovered a salt which is truly the oxymuriat of this metal. By passing a current of oxymuriatic gas through water, in which there was some red oxyd of mercury, after a time the red oxyd became of a very dark brown colour, and part of it was dissolved. The liquor was then evaporated nearly to dryness, and a mixed salt was obtained, consisting partly of corrosive muriat, and partly of another salt which crystallized later than the former, and on being redissolved and crystallized appeared nearly pure. This salt, which has not been much examined, possesses the essential quality of an oxymuriat, in giving out vapours of oxymuriatic acid by the effusion of the sulphuric or any stronger acid.

Phosphat of Mercury.—Phosphoric acid does not act upon mercury, because of the great affinity of phosphorus for oxygen. This acid, however, combines with the oxyds of mercury, forming phosphat of mercury. The best method of forming this salt is by adding phosphat of soda in solution to nitrat of mercury: the phosphoric acid leaves the soda to combine with the oxyd of mercury; the compound falling down in the state of white powder. It should be observed, that if the phosphat of soda is not made from the acid which is obtained by burning phosphorus, the result will not be correct; since the acid obtained from bones is a super-phosphat of lime: and Mr. Dalton has lately found, that the substance at present used in medicine as phosphat of soda, is a triple salt, being a phosphat of soda and lime.

Phosphat of mercury becomes phosphorescent when rubbed in the dark. Like the phosphat of lead, it affords phosphorus by distillation with charcoal. It is said to answer as a substitute for some other mercurials in medicine. It appears from its analysis to be a super-oxyphosphat: this, however, does not appear plausible, from the manner of preparing it. If the nitrat of mercury be fully saturated with acid, the mercury cannot unite with more acid than will form a simple phosphat, except the phosphat of soda be a super-salt, or that the phosphat of mercury on its formation, be resolved into sub and super-salts; both of which

fall down together. If the solution of mercury employed in the preparation of the salt does not contain the second oxyd, the salt cannot be an oxy-salt, nor can any portion of it become so, but at the expence of two salts being formed; the one consisting of the acid united to the protoxyd, as in the case of forming the muriat; and the other consisting of the acid united with the peroxyd, forming an oxy-salt. There is at present so much ambiguity in the facts given of this salt, that we cannot be warranted at present in proposing any thing conclusive. The neutral phosphat with the protoxyd, if such a salt exist, will be as follows:

$$\frac{147 + 7 + 23}{23} = \frac{100}{13}, \text{ or } 13 \text{ acid, and } 87 \text{ base. The}$$

$$\text{oxyphosphat will be } \frac{147 + 21 + 23}{23} = \frac{100}{12}, \text{ or } 12 \text{ acid}$$

$$\text{and } 88 \text{ base. The super-oxyphosphat is } \frac{147 + 21 + 46}{46}$$

$$= \frac{100}{21.5}, \text{ or } 21.5 \text{ acid, and } 78.5 \text{ base. According to the}$$

analysis of Braumcamp and Sigueira, it consists of 28.5 acid, and 71.5 of the peroxyd. The sub-oxyphosphat of mercury, which in all probability may exist, will consist as

$$\text{follows: } \frac{(147 + 21) \cdot 2 + 23}{23} = \frac{100}{6.1}, \text{ or } 6.1 \text{ of acid, and}$$

3.9 of peroxyd.

Fluat of Mercury.—Fluoric acid has no action upon mercury. When an alkaline fluat is added to a solution of nitrat of mercury, an insoluble powder falls down, which is the fluat of mercury. Nothing more is known of this salt.

Borat of Mercury.—This salt may, like the last, be formed by adding borat of soda to nitrat of mercury, the boracic acid having no action upon the metal. It falls down in the form of insoluble powder, like the last salt.

Carbonat of Mercury.—Carbonic acid does not act upon mercury. This salt is formed by adding carbonat of potash to nitrat of mercury. The salt is precipitated in the state of powder of a white colour, and is known in medicine by the name white precipitate of mercury. According to the analysis of Bergman, it consists of 90.9 mercury, and 9.1 of

$$\text{oxygen and carbonic acid. By hypothesis it is } \frac{147 + 14 + 19}{19}$$

$$= \frac{100}{11}, \text{ or } 11 \text{ of acid, and } 89 \text{ of the second oxyd. When}$$

this salt is exposed to heat, the carbonic acid flies off, and leaves the yellow oxyd.

The precipitate formed by adding the carbonat of potash to oxynitrat of mercury is seldom a true carbonat. At the moment it is precipitated, it appears of a beautiful white; but upon shaking the mixture some carbonic acid escapes, and the precipitate assumes a yellowish hue. It is therefore certain, that the precipitate becomes ultimately a sub-carbonat. If it were to remain a carbonat, no carbonic acid ought to escape. The proportions under these circum-

$$\text{stances are } \frac{2 \cdot (147 + 14) + 19}{19} = \frac{100}{5.5}, \text{ or } 5.5 \text{ of car-}$$

bonic acid, and 94.5 of the yellow oxyd. The oxygen in this salt is 4.1 per cent. This, added to the acid, gives 9.6 of oxygen and acid together, which very nearly agrees with the analysis of Bergman above given. Hence it will appear that this was the salt which he analysed, and not the carbonat.

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nat. The sub-carbonat obtained from the nitrat, which gives the protoxyd, is perfectly white.

Acetat of Mercury.—The acetic acid does not act upon mercury; but it dissolves its oxyds, forming several species of salts. When a solution of the acetat of potash is added to a solution of the nitrat of mercury, the acetic acid combines with the protoxyd, and is precipitated in the form of flat scaly crystals, resembling boracic acid, which is the true acetat of mercury. If the oxynitrat be employed which contains the second oxyd, in all probability a change takes place similar to that in the formation of the muriat, by adding muriat of soda. The oxyd is equally divided into the prot and peroxyd, by which an acetat, with some sub-oxyacetat, is formed, while a super-oxyacetat will remain dissolved. This salt is insoluble in alcohol, and nearly so in water.

Oxyacetat.—This salt may be formed by dissolving the peroxyd in the acetic acid. When evaporated it does not crystallize, but forms a yellow coloured mass, which is deliquescent. When water is added to it, the salt is changed into a sub-oxyacetat, which precipitates in the state of a yellow powder, and a super-oxyacetat, which remains dissolved. When the oxyacetat is heated, the acetic acid deprives the mercury of some oxygen, and crystals of the acetat are formed.

Oxalat of Mercury.—Oxalic acid, as well as the other vegetable acids, has no action upon mercury. It combines with the oxyd of mercury, forming an oxalat which is nearly insoluble in water. This salt turns black by the action of light; and, according to the authority of Klaproth, it detonates when heated. Dr. Thomson thinks this salt a constituent of the fulminating mercury of Howard.

Tartrat of Mercury.—If tartrat of potash be added to a solution of nitrat of mercury, the tartrat of mercury will be precipitated in the state of white powder. It is changed to a yellow colour by exposure to light.

Citrat of Mercury.—This salt is scarcely soluble in water. It is decomposed by distillation; the oxyd being reduced by the carbon and hydrogen of the acid.

The *Succinat of Mercury* is slightly soluble.

The *Benzoat of Mercury* is insoluble in water: it sublimes by heat, and is decomposed by the sulphuric, nitric, and muriatic acids.

The *Malat* of this metal is an insoluble powder.

Prussiat of Mercury.—This salt may be formed by boiling the red oxyd of mercury with Prussian blue in water. It is soluble in water to a certain extent, and the solution affords crystals of a prismatic form. It is generally employed to get pure prussic acid, by distillation with sulphuric acid.

Arseniat of Mercury.—When arsenic acid and mercury are heated together in a retort, the mercury is oxydized, and oxyd of arsenic is volatilized, leaving the arseniat of mercury. This salt may also be formed by adding the arseniat of potash to nitrat of mercury in solution. The arseniat of mercury is precipitated in the form of yellow powder.

Molybdat of Mercury, with the protoxyd, is insoluble, but soluble with the peroxyd, which forms an oxymolybdat.

Chromat of Mercury is formed by an alkaline chromat with nitrat of mercury. It falls down in the state of powder of a purple colour. Several triple salts of mercury have been noticed by chemists.

Nitro-oxymercuriat of Mercury has been pointed out by Berthollet. It is formed by adding a solution of muriat of soda to oxynitrat of mercury. A salt is obtained by evaporation in rhomboidal crystals. May not this salt be merely a mixture of muriat of soda and super-oxymercuriat of mercury

crystallized together on account of the simularity of their form?

Oxymercuriat of Soda and Mercury.—This is no doubt the super-oxymercuriat of mercury crystallized with muriat of soda, since it is formed by adding four parts of super-oxymercuriat of mercury to one of muriat of soda.

Sub-oxymercuriat of Mercury and Ammonia.—When ammonia is poured upon the super-oxymercuriat of mercury, the ammonia takes up as much of the acid as leaves the remainder in a state of sub-salt. The two salts fall down together in the state of white powder. The analysis of Fourcroy shews it to consist of certain proportions of the two salts; which is 16 acid, 81 oxyd, and 3 of ammonia. This gives 14 of muriat of ammonia, and 86 of the sub-oxymercuriat of mercury.

This compound salt is soluble in muriatic acid. In this state it has been called *sal alembroth*. In modern nomenclature, it has been denominated the *ammoniaco-mercurial muriat*.

Tartrat of Potash and Mercury.—This salt is formed by boiling the oxyd of mercury with super-tartrat of potash. The oxyd of mercury takes the excess of acid from the super-tartrat to form a tartrat. By evaporation the two crystallize together.

Mercury combines with the sulphuret and super-sulphuret of hydrogen, forming black insoluble precipitates. The first is called hydro-sulphuret, and the second a hydrogurretted sulphuret.

Mercury is very valuable in the arts on account of some of its physical properties, principally for constructing barometers and thermometers.

For the first of these uses the mercury should be perfectly free from air, which it mechanically contains in common with other liquids, and which leaves it when the pressure of the atmosphere is removed. If, therefore, a barometer be made with mercury not freed from air, the column constituting the barometer will be depressed by the spring of the air which rises into the upper part of the tube.

In order to purify mercury for the use of barometers and thermometers, it should first be distilled in a retort of iron or Wedgewood ware. After this, however, it does not acquire its greatest degree of fluidity, nor does it appear perfectly bright. This is principally owing to its being mechanically mixed with some oxyd of mercury. This is completely removed by digesting it a little time with very dilute nitric acid. It becomes very brilliant and fluid. It must now be well washed with water, and the water dried up clean. After this it must be boiled in the tube it is intended to fill. If, while the tube is hot, it be placed, with the open end upwards, under the receiver of an air-pump, and is shaken frequently, a still greater quantity of air is set free, and the mercurial column will stand higher in consequence. We can have little dependence upon the absolute height of the barometer, where this precaution is not taken. See BAROMETER and THERMOMETER.

Mercury is extensively used in gilding, but has been productive of great mischief to the workmen, from their inhaling the vapour which must of necessity be formed.

We have already given some account of this process, sufficient to shew, that if the mercury, when it evaporates, could be forced into some channel, without coming near to the workman, and without mixing with the smoke of the chimney, its deleterious effects would not only be avoided, but the greatest part of the mercury would be saved, which would be of very great importance to the proprietors of such manufactures as employ gilding on a large scale.

We have long been in possession of the means of remedying

ing this evil, at an expence which would speedily be reimbursed by the saving of the mercury alone.

The furnace to produce the heat should be a common air-furnace, but so constructed as to contain a vessel of the nature, though not of the shape, of a muffle. Its form would be determined by the size and figure of the articles to be gilt. It should have such an opening in front, and be so spacious within, as just to allow the workman to turn the articles freely about during their exposure to evaporate the mercury. The upper part of the muffle should have a chimney connected with it of earthenware, of the same kind as that of the muffle. This chimney must pass some distance up the main chimney, in order to be heated for the purpose of rarefying the enclosed air, to cause a rapid current. The earthen chimney, being carried about a yard high, should now branch out of the main chimney, and be continued with an iron pipe to the height of about twenty feet. This iron pipe should communicate with the earthen tube, by a perpendicular branch from it, within about six feet of the bottom of the former, so that one part of the iron pipe ascends to the height of twenty feet, and the other descends about six feet into a cistern of water. By this means a current of air will constantly be entering the mouth of the muffle, which must of necessity carry with it the vapour of mercury, unmix'd with any other extraneous matter. The mercurial vapour will be condensed long before it reaches the top of the iron tube, and will fall into the cistern of water below. The water will prevent the oxydation of the mercury between the times of removing it.

Another advantage attending this apparatus, will be the uniform heat to which the evaporable surface will be exposed. The greatest heat of the fire will be much less in this contrivance, and consequently less annoying to the face and eyes of the workman. This evil, however, may be still made less, by interposing a screen of glass between the face and the fire.

MERCURY, or *Hydrargyrum*, in the *Materia Medica*. This fluid, supposed by the Greeks to be poisonous and corrosive, was introduced into medicine, by the Arabians, as an ingredient in external applications, against different cutaneous maladies. The practice was followed by some physicians in Europe towards the end of the thirteenth century; but was not established or looked upon in general to be safe, till about the beginning of the sixteenth, when the venereal distemper, then lately received from America, was found to yield to mercurial applications alone: and now also the internal use of mercury began to be ventured on, in this and in other diseases. Crude and fluid mercury taken internally produces no effect on the body; because the adhesion of its integrant parts to each other hinders their division and distribution, or solution, without which it cannot have any effect. In its crude state, therefore, it does nothing but load the stomach and intestines. It falls downwards by its weight, and goes out of the body with the feces, in the same state in which it entered. Hence some have been induced to give a pound or more in violent constipations, in order to open obstructions that had resisted the common methods of cure by purgatives, relaxants, and emollients. But the practice has been attended with no remarkable success.

Dr. Dover, in his "Physician's Legacy to his Country," having recommended crude mercury or quicksilver as a most beneficial medicine for several diseases, it had for some time a great run in London, which occasioned the writing a great many pamphlets for and against it. Dr. Cheyne also greatly recommends this medicine in his treatise, entitled "The Rational Method of curing Diseases."

The authors of the Medical Essays of Edinburgh assure

us, that though some they knew had taken an ounce or two of crude mercury each morning for several weeks, yet they were not apprized of any instance of its increasing any of the sensible evacuations; but they have been told, that some who used it thus, had passed some of it with their urine, and that the hands of others, taking this medicine, had tinged their snuff-boxes, &c.

But we have an account of the effects of crude mercury on a person who had the advice of his physician for the taking it, in a remarkable case, recorded in the Philosophical Transactions, about the time when Dr. Dover had brought it into such general use; and as the effects of it, in this case, may serve to caution people as to the use of it, it may be proper to give the substance of it, which is this: a person had long been subject to great difficulty in going to stool, for which he at length took several ounces of crude mercury at different times, but without relief. Upon the opening of the abdomen there issued out a great quantity of wind, before the stomach or guts were wounded. The stomach was empty, and its inner coat violently inflamed. The small guts were, in many places, fouled with a black powder, resembling æthiops mineral, and in several parts of them were found small globules of quicksilver. The black powder was doubtless the quicksilver altered into a sort of æthiops in the body. The colon was inflamed and distended, and contained six quarts of liquid excrement, among which was a great deal of crude mercury, and of the same black powder. This gut also was inflamed on the outside, and had formed an abscess where it adhered to the omentum; the other guts in contact with this part also shared this disorder. On the lower part of the colon the coats became schirrous, and the passage was very small. Some of the valves were also become schirrous, and obstructed the passage, and a small plum-stone was found buried in the villose coat of this intestine: This had also formed a small abscess, which discharged itself into the pelvis. What part of these symptoms was owing to the taking the quicksilver is easily seen, and such effects may be guarded against for the future, by observing the state of the patient before it is given. Phil. Transf. N^o 442. p. 295.

But when mercury is much divided, so that its molecules cannot again unite and form fluid mercury by the interposition of proper substances, it operates with great power, and extends its action through the whole habit. In these forms, whether taken internally, or introduced into the blood from external applications, it seems to liquefy all the juices of the body, and may be so managed as to promote excretion through all the emunctories. The salutary effects of mercurials have, in many cases, very little dependence on the quantity of sensible evacuation. Venereal maladies and chronical distempers, proceeding from a visciditv of the humours and obstructions of the small vessels, are often successfully cured by mercurials taken in such doses as not to produce any remarkable discharge: especially if assisted by diaphoretics, and a warm diluting regimen. In this view, camphor, and the resin or extract of gualiacum, are frequently joined to the mercury; and to the more active preparations, a little opium; which not only promotes the diaphoresis, but prevents the mercury from irritating the first passages, and running off by the grosser emunctories. Mercurials are always pernicious in the true scurvy, and in constitutions inclined to this disease, whose humours are disposed to a putrescent state; and a long continued use of mercury colliquates the whole mass of blood, and tends to weaken the nerves, so as to bring on tremors and paralyfes. Mercurials are destructive to insects, perhaps of every kind: they are sometimes given internally against worms; and Van
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Helmolt says, that water in which mercury has lain some time, though insipid, will destroy worms; and Mr. Boyle seems to recommend it as an innocent and useful cosmetic. Works Abr. vol. iii. p. 345.

Although mercury in its native metallic state is a perfectly inert substance with respect to any operation on the animal system, it may be rendered active by some changes in its chemical state, or some addition to its substance. When rendered thus active, it seems to be a stimulus to every sensible and moving fibre of the body to which it is applied; and it is particularly a stimulus to every excretory of the system, to which it is externally or internally applied. Besides its noted effects upon the excretories of the saliva, it seems to operate upon the whole of those of the alimentary canal. It proves often diuretic; and Dr. Cullen says, that he has met with particular proofs of its reaching and acting upon the organs of perspiration. Whilst it is known to operate more upon certain excretions than upon others, it may be presumed, that when any tolerable quantity is thrown into the body, it is in part distributed over the whole; and therefore its medicinal effect is, that it is the most universal aperient and deobstruent known. Dr. Cullen, however, contends, in opposition to the common opinion, that the effects of its producing evacuations depend entirely upon the stimulus given to the excretories, and not at all to any change produced in the state of the fluids. Upon many occasions of mercury thrown into the body very largely, this author has found no difference in the appearance of the state of the blood drawn out of the veins. From the stimulus given by mercury to the whole system, he has always found the blood putting on the same appearance that it does in inflammatory diseases, nor has he observed any circumstance that implies any diminution of its ordinary consistence. Although it has been the common opinion, that mercury diminishes the consistence of the blood, and very much increases its fluidity, no evidence or proof of this as a fact, known to Dr. Cullen, has been produced; and he thinks, that it has been taken up upon mistaken facts, and supported by a theory which is without foundation. Upon the whole, our author concludes, that the chief effects of mercurial medicines are to be ascribed to their general stimulus of the system, and especially to their stimulating the various excretories of it. Concerning its medical effects in the disease to which it has been most generally and most efficaciously applied, we refer to the article *LUES VENEREA*. But the various operations of mercury are modified, in a very remarkable degree, by the different preparations of it which have been proposed and employed. In consequence of the changes which it undergoes by its numerous preparations, so that it is become one of the most considerable articles in the chemical pharmacy, and a remedy of the most extensive application, it is not only a powerful stimulant, but it enters into the circulation, quickens the vascular action, and excites powerfully the whole of the glandular system, increasing all the secretions and excretions. Hence it happens, that its various preparations produce different effects, operating sometimes as stimulants, astringents, cathartics, or emmenagogues, and locally as errhines; and hence it becomes useful in a great variety of diseases; such as febrile affections, spasms, cachectic diseases, glandular obstructions, and cutaneous eruptions. Since Paracelsus, counteracting ancient authority and practice, evinced that it might be exhibited internally, not only with safety, but with advantage, during a period of almost 300 years, experience has fully sanctioned its use; and as Mr. Pearson justly observes, "not one medicine besides, derived from the animal, vegetable, or mineral kingdom, has maintained its credit, with men actually em-

ployed in extensive practice, during a tenth part of that period." Although it is a medicine capable of being abused, to the disappointment of the patient, and to the injury of the constitution, yet under the direction of cautious and judicious practitioners, it may rank as one of the most useful of the articles of the *Materia Medica*.

The chemical changes which have been proposed, in order to render mercury active and useful, have been many and various; but Dr. Cullen, in his "*Materia Medica*," refers them to four heads; 1st, by being converted into vapour; 2dly, by calcination; 3dly, by triture with viscid fluids; and, 4thly, by being combined with acids of different kinds. The first mode of employing mercury, may perhaps (he says) be the best adapted to some local complaints; but its application to the whole body is attended with so much hazard and uncertainty in the administration, as hardly ever to be an eligible practice. The preparation by calcination is not, as had been formerly supposed, of any peculiar power or advantage; and is therefore as he believes, little employed in the present practice; this operation serving merely to put the mercury in a condition to be acted upon by the acids of the stomach, and the preparation not differing from others made by a combination with acids. The preparations by triture seem to be milder than those formed by a combination with acids; but imperfect triture renders the practitioner often uncertain in their use. The triture with unguinous substances gives the advantage of its being introduced by unctio upon the skin; and when it has been properly prepared, and is properly administered, it affords a mode of introducing mercury, which is often less liable to purging, and therefore more convenient than the employment of the saline preparations. These latter are different according to the acid employed.

Those made by the vegetable acid are milder and more manageable than those formed with any of the fossil acids. Of these, the combination with the muriatic acid, when the acid is in its full proportion to the mercury, as it is in the corrosive sublimate, is certainly more active and powerful than any other saline preparation. The use of it has been often convenient and effectual; but its operation is so different in men of different constitutions, that the employment of it requires much management and discretion. It is rendered much milder in the preparation of the *Mercurius dulcis*, which has given occasion to the frequent employment of this, which, according to Dr. Cullen, does not seem to be a very eligible preparation. It does not seem to be so readily diffusible in the system as many others, because it is more ready than many others to operate upon the intestines, and run off by stool. This may give it some advantages for its being combined with purgatives; but for that reason it is less fit for being employed to act upon the salivary glands, or upon the other excretions of the system. Dr. Duncan, in the "*Edinburgh New Dispensatory*," has given a table of official preparations of mercury, of which Mr. A. T. Todd has availed himself in the valuable "*London Dispensatory*," lately published. We shall take the liberty of inserting his table for the satisfaction of our medical readers, recommending the work itself to their perusal.

Official Preparations of Mercury.

- I. By distillation to purify the metal.
 1. Hydrargyrus purificatus. L. D.
- II. By trituration; (suboxidized).
 - a. With animal fat.
 2. Unguentum Hydrargyri fortius. L. Ung. Hydrargyri. D.
 3. Unguentum Hydrargyri. E.

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4. Unguentum Hydrargyri mitius. L. D.
5. Linimentum Hydrargyri. L.
6. Emplastrum Ammoniaci cum Hydrargyro. L. D.
Hydrargyri. L. E.
- b. With saccharine substances.
7. Pilule Hydrargyri. L. E. D.
- c. With carbonate of lime.
8. Hydrargyrus cum Creta. L. D.
- d. With carbonate of magnesia.
9. Hydrargyrum cum Magnesia. D.
11. By the action of heat and air: (oxidized).
10. Hydrargyri Oxydum rubrum. L. Oxydum Hydrargyri. D.
14. By the action of acids.
- a. With sulphuric acid; (suboxidized).
11. Subsulphas Hydrargyri flavus. E. Oxydum Hydrargyri sulphuricum. D.
- b. With nitric acid; (suboxidized).
12. Unguentum Hydrargyri nitrati. L. E. Unguentum Supernitratis Hydrargyri. D.
13. Unguentum Nitratis Hydrargyri mitius. E.
(oxidized).
14. Hydrargyri Nitrico-oxydum. L. Oxidum Hydrargyri rubrum per Acidum nitricum. E. Oxydum Hydrargyri nitricum. D.
15. Unguentum Hydrargyri nitrico-oxydi. L. Unguentum Oxidi Hydrargyri rubri. E. Unguentum Subnitratis Hydrargyri. D.
- c. With muriatic acid.
† sublimated; (oxidized).
16. Hydrargyri Submurias. L. E. Submurias Hydrargyri sublimatum. D.
17. Pilule Hydrargyri Submuriatis. L.
(oxidized and acidified).
18. Oxymurias Hydrargyri. L. Murias Hydrargyri. E. Murias Hydrargyri corrosivum. D.
19. Liquor Hydrargyri Oxymuriatis. L.
†† precipitated; (oxidized).
20. Submurias Hydrargyri præcipitatus. E. D.
- d. With acetic acid; (suboxidized).
21. Acetis Hydrargyri. E. Acetas Hydrargyri. D.
- V. By precipitation with earths and alkalies from acid solutions.
- a. By lime-water from the nitric solution; (suboxidized).
22. Hydrargyri Oxydum cinereum. L.
- b. By ammonia from the nitric solution; (suboxidized).
23. Oxydum Hydrargyri cinereum. E. Pulvis Hydrargyri cinereus. D.
- c. By ammonia from the muriatic solution; (oxidized).
24. Submurias Hydrargyri ammoniatum. D. Hydrargyrus Præcipitatus albus. L.
25. Unguentum Submuriatis Hydrargyri ammoniati. D. Ung. Hydrargyri Præcipitati albi. L.
- VI. Combined with sulphur.
- a. By trituration.
26. Sulphuretum Hydrargyri nigrum. E. D.
- b. Sublimated.
27. Hydrargyri Sulphuretum rubrum. L. D.

We shall here subjoin a more particular account of these different preparations, as they occur in the London, Edinburgh, and Dublin dispensaries, annexing to the modern names the appellations by which they have been distinguished in former, now superseded, nomenclatures.

Hydrargyrus purificatus. Argentum vivum purificatum, P. L. 1745.

Rub together 6lbs. of mercury, by weight, with 1lb. of iron filings, and distil the mercury from an iron retort, by

the application of heat to it. The E. D. directs four parts of mercury, and one part of filings of iron, to be rubbed together and distilled from an iron retort. The Dub. D. procures it by distilling off slowly 4lbs. from 6lbs. of mercury.

Hydrargyri Actus, acetite of mercury, is prepared, according to the E. D., by mixing 3 oz. of purified mercury with 4 oz. or a little more than may be necessary for dissolving the mercury, of diluted nitrous acid; and having dissolved 3 oz. of acetite of potash in boiling water, by adding to this solution, while hot, the former, and mixing them by agitation. When the mixture has been set aside to crystallize, the crystals are washed in a funnel with cold distilled water, and then dried with a gentle heat.

Hydrargyri Actus, acetate of mercury, is obtained, according to the directions of the Dub. D., by adding three fluid-ounces of diluted nitrous acid to 3 oz. of purified mercury, and digesting, when the effervescence ceases, upon hot sand, for the complete dissolution of the metal; then mixing this solution with eight pints of boiling distilled water in which 3 oz. of acetate of kali have been previously dissolved, and passing the mixture immediately through a double linen cloth: afterwards cooling it that crystals may be formed, washing these with cold distilled water, and drying them upon paper with a very gentle heat.

All the vessels in these two processes must be of glass.

The acetate of mercury is antisyphilitic, and alterative; but it is scarcely ever used, except as an active ingredient in Keyser's pills. In some cutaneous affections a solution of it, in the proportion of two grains in f.ʒii of rose water, is externally applied. The internal dose is 1 gr. night and morning.

Hydrargyri oxymurias, oxymuriate of mercury, *Hydrargyrus muriatus,* P. L. 1787, *Mercurius corrosivus sublimatus,* P. L. 1745, P. L. 1720, is prepared, according to the L. D. 1809, by boiling 2lbs. by weight of purified mercury with 30 oz. by weight of sulphuric acid in a glass vessel until the sulphate of mercury is left dry: then, rubbing this, when cold, with 4lbs. of dried muriate of soda, in an earthenware mortar, and afterwards subliming it in a glass cucurbit, gradually increasing the heat. The corrosive sublimate is denominated *Murias hydrargyri,* or muriate of mercury, in the E. D. and prepared much in the same manner. In the Dub. D. it is denominated *Murias hydrargyri corrosivum.* It is prepared by dissolving 2lbs. of purified mercury in 3lbs. of sulphuric acid, gradually increasing the heat until the matter becomes almost dry; when cold, rub it with 2½lbs. of dried muriate of soda in an earthenware mortar, and then sublime it, in a proper vessel, with a gradually increased heat. Mr. Chenevix found, that if a bit of copper be put into a solution of corrosive sublimate, a white powder usually falls to the bottom, and that powder is "calomel." When washed, it does not contain an atom of copper, nor of corrosive sublimate.

This salt is a powerful stimulant and alterative; and in large doses it is one of the most violent of the metallic poisons. It was formerly much extolled as an antisyphilitic; but Mr. Pearson observes, that even in checking the progress of the secondary symptoms, relieving venereal pains, and healing ulcers of the throat, it never confers permanent benefit.

It is said to be used with greater advantage in old ulcers, chronic rheumatism, and cutaneous diseases, particularly lepra. (See LEPROSY.) The sensible operation of this salt is by urine, but sometimes it occasions the most violent nausea, griping, and purging; in which cases it should be combined with opium; and during the use of it, it is necessary to take some mucilaginous fluid, in order to allay its irritation. It is also

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used as an external application. The dose is from $\frac{1}{8}$ th to $\frac{1}{4}$ th of a grain, twice a day, formed into a pill with a crumb of bread or extract of poppies. Van Swieten brought this salt into more general use for the cure of venereal maladies: he dissolves a grain of the sublimate in 2 oz. of proof spirit, but rectified spirit dissolves it more perfectly, and gives of this solution from one to two spoonfuls twice a day, continuing the medicine so long as any of the symptoms remain, with low diet, and plentiful dilution. There are many instances in the London Med. Obs. and Enq. of the success of this method.

Hydrargyri oxymuriatis Liquor, solution of oxymuriate of mercury, is prepared by dissolving eight grains of oxymuriate of mercury in fifteen fluid-ounces of distilled water, and adding to it a fluid-ounce of rectified spirit. This solution is directed (P. L. 1809) in order to facilitate the administration of divisions of the grain of this active medicine. Each fluid-drachm contains $\frac{1}{7}$ th of a grain of the salt. This may be given as an antisyphilitic in doses of from f.ʒfs to f.ʒij, in f.ʒij of linseed infusion, or water and syrup, and in more minute doses, when its effects as an alterative only are required. As a local application, this solution diluted with two parts of water forms an useful gargle in venereal sore-throat, and without dilution it serves as a gargle for breaking the abscess in cynanche tonsillarum, when suppuration takes place. Diluted with an equal quantity of water, it is employed as a wash against tetter and psoa; and very largely diluted, it may be used as an injection in gonorrhœa, or given in the form of enema, when the stomach will not bear it. This sublimate is a violent escharotic, and eats away proud flesh: half a drachm of it dissolved in a pint of lime-water turns it yellow; it is then called "phagedænic water," and is used to wash ulcerous and tetterous eruptions. A strong solution, made by boiling the same quantity of powdered sublimate with equal its weight of alum in a pint of common water, until half the liquor is wasted, is the "alluminous water" applied to the same purpose.

Hydrargyri submuriatis, submuriate of mercury, Calomelas, *Hydrargyrus muriatus mitis*, P. L. 1787, *Mercurius dulcis sublimatus*, P. L. 1745, *Aquila alba*, *Manna metallorum*, *Sublimatum dulce*, is prepared, according to P. L. 1809, by rubbing together 1lb. of oxymuriate of mercury with 9 oz. by weight of purified mercury, until the metallic globules disappear, then subliming, taking out the sublimed mass, pulverizing it, and subliming it in the same manner twice more successively; and, lastly, bringing it into the state of very fine powder, by the same process which is directed for the preparation of chalk. A very elegant and useful modification of this process has lately been adopted by Mr. Howard, chemist, who sublimes the submuriate into water, with the vapour of which it mixes as it arises in its gaseous form, and subsides at once as a fine impalpable precipitate to the bottom of the water. Formerly preparations of mercury analogous to this were distinguished according to the number of sublimations they had undergone. After three sublimations it was *mercurius dulcis*, after six, *calomelas*, and after eight, *panacea mercurialis*; but, according to Beaumè, a small portion of oxymuriate is formed by each of these repeated sublimations, probably from the absorption of oxygen by the heated preparation from the air of the vessels, and hence no advantage, but rather the contrary, must arise from an increased number of the operations. The Pharmacopœia of 1745 had six sublimations; that of 1787, as the directions seem to express it, five; and now they are reduced to three, which are, in fact, fully sufficient, especially with that subsequent application of water which the mode adopted for reducing it to a fine powder requires.

Hydrargyri submuriatis, five *Calomelas*, Edinb. D. Submuriate of mercury, or calomel; is obtained by rubbing together 4 oz. of muriate of mercury pulverized in a glass mortar with 3 oz. of purified mercury, in a glass mortar with a little water, to prevent the acrid powder from rising, until the mercury be extinguished; putting the dried powder in an oblong phial, one-third full, and subliming it in a sand-bath. When the sublimation is completed the phial is broken, and the red powder round its bottom, and the white at its neck, are rejected; the rest of the mass is sublimed, and reduced to a fine powder, which is, lastly, to be well washed with boiling distilled water.

Hydrargyri, Submuriatis sublimatum, five *Calomelas*, Dub. D. is prepared much in the same manner with that of the Lond. Pharmac. The final trituration and levigation are intended to separate any corrosive muriate that may have been formed; and in order to ascertain this, the Dublin college prescribes the following test; the sublimed matter is pulverized and repeatedly washed with distilled water, until the solution poured off, no longer lets any sediment fall on the addition of a few drops of carbonate of kali.

Calomel is the most useful and the most frequently employed of all the preparations of mercury. It is antisyphilitic, antispasmodic, alterative, deobstruent, purgative, and errhine. As a remedy in syphilis, it can be fully confided in, when its disposition to run off by the bowels is counteracted by opium; and in the same state of combination it is also found efficacious in several convulsive affections, as epilepsy, trismus, and tetanus; and in that species of spasmodic stricture which occurs in virulent gonorrhœa. As an alterative and deobstruent, it is employed with advantage in cutaneous eruptions, as lepra, scabies, and psoa, in which cases it is combined with antimonials and guaiacum; and in hepatitis, and glandular obstructions; in dropsies it assists the action of squill and foxglove; and as a purgative it may be employed with safety in almost every form of disease not attended with visceral inflammation, or where there are not great irritability and delicacy of habit. Calomel, however, does not act with certainty as a purgative even in large doses, and hence it is generally combined with scammony, jalap, or some other active cathartic. The usual dose to affect the habit and produce ptyalism is from gr. j to grs. ij, in a pill with opium, given night and morning; and from grs. iij to grs. viij act in general as a purgative: but in some complaints, as yellow fever and croup for example, in which it is supposed to exert a specific effect, this dose has been repeated every two or three hours, until upwards of 100 grains have been taken in a very short space of time.

On account of its insolubility and great specific gravity, it can be given only in the form of pills.

Hydrargyri Submuriatis precipitatus, precipitated submuriate of mercury, Edinb. is prepared by mixing 8 oz. of purified mercury with the same quantity of diluted nitrous acid, and towards the end of the effervescence digesting with a gentle heat, the vessel being frequently shaken; at the same time let 4½ oz. of the muriate of soda be dissolved in 8lbs. of boiling water; and to this let the other solution be added while it is warm, and let them be mixed very quickly together. After the precipitate has subsided, pour off the saline fluid, and wash the submuriate of mercury by frequent affusions of warm water, which are to be poured off each time after the precipitate subsides, until the water comes off tasteless.

Hydrargyri Submuriatis precipitatum is obtained by pouring five fluid-ounces of diluted nitrous acid on 7 oz. of purified mercury in a glass vessel, and at the termination of the effervescence digesting with a gentle heat for six hours, with frequent agitation. The heat should then be somewhat raised.

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raised that the solution may boil a little, which being poured off from the residual mercury, should be quickly mixed with 10lbs. of boiling water, in which 4 oz. of muriate of soda have been previously dissolved; the subsiding powder is washed with warm distilled water, as long as the fluid poured off from it yields a precipitate on the addition of a few drops of the solution of subcarbonate of kali; and lastly, it is to be dried. In reference to these processes of the two colleges, we may here note, that Mr. Murray has ascertained, that the quantity of mild muriate obtained from a solution of \mathfrak{zj} of mercury in the diluted nitric acid in the cold is a little more than \mathfrak{zj} ; while from the same quantity dissolved with the application of heat, the precipitate did not exceed \mathfrak{zfs} , while the liquor held dissolved much more corrosive muriate than the other. Hence it may be inferred, that the greatest proportion of pure mild muriate of mercury by precipitation may be obtained, by preparing the nitrat slowly, and without the aid of heat, which ought not to be employed in any part of the process.

The properties of this substance are essentially the same with those of common calomel, and therefore it may be regarded as superfluous.

Hydrargyrus precipitatus albus, white precipitated mercury, *Calx hydrargyri alba*, P. L. 1787, *Mercurius precipitatus albus*, P. L. 1745, is prepared, according to the directions of the London college, P. L. 1809, by first dissolving \mathfrak{zlb} . of muriate of ammonia, and then the same quantity of oxymuriate of mercury, in four pints of distilled water, and adding to it half a pint of the solution of subcarbonate of potash; then washing the precipitated powder until it becomes tasteless, and afterwards drying it.

Hydrargyri Submuriatis ammoniatum, ammoniated submuriate of mercury, Dub. is obtained by adding to the fluid which has been poured off from the precipitated submuriate of mercury a quantity of water of caustic ammonia sufficient to precipitate the whole of the metallic salt; then washing the precipitate with cold distilled water, and drying it upon bibulous paper. This preparation is only used, in combination with lard, as an ointment for the cure of the itch, and some other cutaneous eruptions. See *UNGUENTUM Hydrargyri precipitati albi*.

Hydrargyrus cum Creta, mercury with chalk, *Mercurius alkalizatus*, P. L. 1745, is prepared by rubbing together 3 oz. by weight of purified mercury with 5 oz. of prepared chalk, until the metallic globules disappear. As this preparation is milder than any other mercurial one, and does not so easily act upon the bowels, it is very much used by many practitioners. It appears to be slightly oxydized by the trituration, as it contains, according to Fourcroy, only $\frac{1}{85}$ of oxygen.

Hydrargyrus cum Creta, mercury with chalk, of the Dublin college, is prepared in the same manner as the mercury with magnesia, employing precipitated chalk instead of magnesia. This substance is alterative, and occasionally prescribed in tinea capitis, and other cutaneous affections; but it merits very little attention. The dose may be from 5 gr. to \mathfrak{zfs} , given twice a day, mixed in any viscid substances.

Hydrargyrus cum magnesia, mercury with magnesia, of the Dublin college, is prepared by triturating an ounce of mercury with the same quantity of manna in an earthen mortar, adding as many drops of water as will give to the mixture the thickness of syrup, and continuing the rubbing until the metallic globules disappear; then adding, whilst the trituration is continued, a drachm of magnesia, and after the whole is well mixed, a pint of hot water, agitating the mixture. When it has remained some time at rest, that the sediment may subside, decant from it the fluid, repeat the wash-

ing a second and a third time, that the whole of the manna may be removed; and add the remainder of the magnesia to the sediment, while it is still moist; and lastly, dry the powder upon bibulous paper. The addition of the manna in this and the former process is intended only to facilitate the oxydization of the mercury; and it is afterwards removed by the subsequent washings, so that the product remains a grey or black oxyd of mercury mixed with magnesia. This preparation is of no great importance.

Hydrargyri nitrico-oxydum, nitric oxyd of mercury, *Hydrargyrus nitratus ruber*, P. L. 1787, *Mercurius corrosivus ruber*, P. L. 1745, *Mercurius precipitatus corrosivus*, P. L. 1720, is prepared by the directions of the Lond. Pharm. by mixing in a glass vessel 3lbs. by weight of purified mercury, $1\frac{1}{2}$ lb. by weight of nitric acid, in two pints of distilled water, and boiling the mixture in a sand-bath until the mercury being dissolved and the water evaporated, a white mass remains. Rub this into powder, and put it into another shallow vessel, then apply a moderate heat, and raise the fire gradually until the red vapour ceases to arise. The component parts of this oxyd are, according to Fourcroy, mercury 92, and oxygen 8; according to Chenevix, mercury 85, oxygen 15.

Hydrargyri Oxydum rubrum per acidum nitricum, olim, *Mercurius precipitatus ruber*, Edmb. red oxyd of mercury by nitric acid, formerly red precipitate of mercury. Dissolve a pound of purified mercury in 16 oz. of diluted nitrous acid; and evaporate the solution over a gentle fire to a dry white mass, which being rubbed to a powder, is to be put into a glass cucurbit, and covered with a thick plate of glass: then adapt a capital to the vessel, and having placed it in a sand-bath, let the contained matter be roasted with a fire gradually raised until it passes into very red small scales.

Hydrargyri Oxydum nitricum, Dub. nitric oxyd of mercury. Mix 10 oz. of purified mercury, and ten fluid-ounces of diluted nitrous acid in a glass, and dissolve the mercury with a gradually raised heat: then increase the fire until the residuary matter in the bottom of the vessel be converted into red scales.

Nitric oxyd of mercury is stimulant and escharotic. It is merely used externally, when rubbed into a fine powder, as a stimulant to old sores, and for destroying fungus. As a powder, in the proportion of gr. fs. to grs. iv of sugar, it is blown into the eye to remove specks in the cornea; and formed into an ointment with lard, it is a useful application to ulcerations of the eye-lids, and to chancres. See *UNGUENTUM Hydrargyri nitrico-oxidi*.

Hydrargyri oxydum rubrum, red oxyd of mercury, *Hydrargyrus calcinatus*, P. L. 1787, *Mercurius calcinatus*, P. L. 1745, is prepared by pouring *e. g.* 1lb. by weight of purified mercury into a glass matras with a very narrow mouth and broad bottom: apply a heat of 600° to this vessel, without stopping it, until the mercury has changed into red scales; then reduce these to a very fine powder. The whole process may probably require an exposure of six weeks.

Hydrargyri oxydum, Dub. oxyd of mercury, is obtained by taking any quantity of purified mercury, and proceeding as in the last article.

According to Lavoisier 100 parts of this oxyd contain 7 of oxygen; Fourcroy makes the proportion of oxygen 8, and Chenevix, 15 parts.

This is a very active preparation of mercury, and has been employed by some eminent practitioners, *e. g.* John Hunter, as an internal remedy in syphilis. See *LUES VENEREA*. Its effects, however, are violent, so that it is now scarcely

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ever employed internally, or as an antisyphilitic. The dose may be gr. j combined with gr. ss of opium, in the form of pill, night and morning. It is chiefly used as an external stimulant and escharotic in the same cases as the nitric oxyd; being previously rubbed to a fine powder, and either sprinkled over the ulcers, or united with lard, and applied as an ointment.

Hydrargyri oxydum cinereum, grey oxyd of mercury, is formed, according to the instructions of the Lond. Pharm., by boiling an ounce of submuriate of mercury in a gallon of lime-water, constantly stirring until a grey oxyd of mercury is separated; wash this with distilled water, and then dry it. The same preparation of the Edinb. Disp. is formed of four parts of purified mercury, five parts of diluted nitrous acid, 15 parts of distilled water, and a sufficient quantity of water of carbonate of ammonia. Dissolve the mercury in the acid; add gradually the distilled water, then pour in as much water of carbonate of ammonia as may be sufficient for precipitating the whole of the oxyd of mercury, which is to be afterwards washed with pure water, and dried.

Hydrargyri Pulvis cinereus, Dubl. grey powder of mercury, is formed by dissolving 2 oz. of mercury in two fluid-ounces of diluted nitrous acid, in a slow heat, and diluting the solution with eight fluid-ounces of cold water; then dropping into it 1½ oz. of the water of carbonate of ammonia, or as much as may be sufficient for precipitating the whole of the metal, which is to be washed with boiling distilled water, until the fluid, poured off, yields no sediment, when water of sulphuret of ammonia is dropped into it: lastly, let the precipitate be dried. The constituents of the grey oxyd of mercury are supposed to be 96 parts of mercury, and 4 of oxygen, in 100 parts.

The grey oxyd of mercury, when well prepared, may be used as a substitute for the oxyd prepared by trituration; and as it is more likely to be always of an uniform strength, it may of course be more depended on than those preparations. It has been objected to for forming ointment, in order to serve the purposes of mercurial frictions (see *UNGUENTUM Oxydi hydrargyri cinerei*); but the objection may have been owing to the use of that form of preparation which contains the triple salt. It has been used with advantage for fumigation, both locally applied towards the healing of venereal ulcers, and, generally, to bring the habit under the influence of mercury, when it could not be introduced by the ordinary mode. The dose of this oxyd is from gr. i. to grs. iii. given in the form of pill twice a day.

Hydrargyri, Sulphuretum nigrum, olim, *Æthiops mineralis*, Edinb. Dubl. black sulphuret of mercury, formerly æthiops mineral. This is prepared by rubbing together equal weights of purified mercury and sublimed sulphur in a glass mortar with a glass pestle, until the globules of mercury altogether disappear. It may also be made with double the quantity of mercury.

This mercurial preparation is alterative and anthelmintic; it is chiefly employed against scrophulous swellings, and in cutaneous affections; and has been found useful as an antidote to ascarides. It must be long used to produce any sensible effects. The dose is from grs. v. to f. ʒss., given twice or three times a day. See *ÆTHIOPS Mineral*.

Hydrargyri sulphuretum rubrum, red sulphuret of mercury, *Hydrargyrus sulphuratus ruber*, P. L. 1787, *Cinnabaris factitia*, P. L. 1745, is prepared by melting 8 oz. of sublimed sulphur over the fire, and mixing in 40 oz. by weight, of purified mercury; and as soon as the mass begins to swell, removing the vessel from the fire, and covering it

with considerable force, to prevent inflammation; then rubbing the mass into powder and subliming.

Hydrargyri, Sulphuretum rubrum, Dubl. red sulphuret of mercury, is prepared as in the last process. Red sulphuret of mercury is alterative and deobstruent. It was formerly much used in cutaneous diseases, gouty and rheumatic affections, and in cases of worms, but it is now scarcely ever employed. It has been recommended for fumigations in syphilis; but on account of the sulphurous vapours it is less fit for this purpose than the grey oxyd. The dose for internal use is from grs. x. to ʒss. made into an electuary or bolus.

Hydrargyri Subsulphas flavus, olim, *Turpethum minerale*, Edinb. yellow sub sulphate of mercury, formerly, *Turbith mineral*, *Hydrargyrus vitriolatus*, P. L. 1787; also *Mercurius emeticus flavus*. For preparing it, take of purified mercury 4 oz.; sulphuric acid 6 oz.; put them into a glass cucurbit, placed in a sand-bath, and boil them to dryness; pulverize the white mass which is left at the bottom of the vessel, and throw it into boiling water; it will be immediately converted into a yellow powder, which is to be washed with frequent affusions of warm water.

Hydrargyri Oxydum sulphuricum, Dubl. sulphuric oxyd of mercury, is prepared by dissolving in a glass vessel 1 lb. of purified mercury, in 1½ lb. of sulphuric acid, with a sufficient degree of heat, and gradually raising the fire until the mass be completely dried. This, by the affusion of a large quantity of hot water, will immediately become yellow and fall into powder, which is to be well triturated with the water in an earthenware mortar. After pouring off the supernatant fluid, wash the powder with repeated affusions of hot distilled water, as long as any precipitate is produced in the decanted liquor on the addition of a few drops of water of subcarbonate of kali; and, lastly, dry it.

This preparation is emetic, discentient, alterative, and errhine; but as its operation is violent, it is seldom administered as an internal remedy. As an errhine, it has been useful in chronic ophthalmia, and diseases of the head; but in this case its acrimony should be sheathed by some bland powder, as starch, or liquorice-root powder, in the proportion of grs. v. to gr. i. of the subsulphat. In doses of gr. v. it operates as a very powerful emetic.

MERCURY, Coralline. See *ARCANUM Corallinum*.

MERCURY, Fulminating. This curious compound was discovered by Mr. Howard, who has given us the following process for preparing it. Dissolve 1.0 grains of mercury in 1½ ounce, by measure, of nitric acid, of the specific gravity of 1.3, with the assistance of heat. When this solution is cold, pour it upon two ounces, by measure, of alcohol: let this mixture be exposed to heat till an effervescence takes place, when the heat must be withdrawn. The effervescence continues with violence for some time, accompanied by the evolution of a dense white vapour, which Mr. Howard conceived to be the etherized nitrous gas combined with oxyd of mercury. During this process a white powder gradually subsides, which must be well washed, filtered, and dried on a sand-bath heated by steam, as a temperature a little higher would cause its explosion. The powder thus obtained is rather crystalline in its appearance. When it is heated to 368°, it explodes with great violence, producing a vivid flash of light, with but little heat. The same explosion takes place by the blow of a hammer, by an electric spark, and by flint and steel. The surface of the body on which it is exploded becomes always covered with a white film, which is the reduced mercury. This indicates that the oxygen of the oxyd has had some share in producing the effect. The explosion by means of a blow is so violent, as frequently to indent

violent the face of the hammer and the anvil. When concentrated sulphuric acid is added to fulminating mercury, it instantly explodes. The dilute acid decomposes it without explosion. A gaseous substance is given out, which consists of carbonic acid mixed with an inflammable gas, which burns with a greenish flame. A white powder is at the same time precipitated, which is the oxalat of mercury mixed with a little running mercury. The composition of fulminating mercury is, therefore, found to be oxalat of mercury combined with the etherized nitrous gas. This substance has been since examined by other chemists. Fourcroy is of opinion that it may be varied in its properties by varying the process. When heat is continued during the whole time of the effervescence, a substance is produced of a greenish colour, which detonates with less force, and emits a blue flame when laid on hot coals. In this case, Fourcroy supposes it to contain ammonia, and more of the vegetable matter of the alcohol. We have before noticed that the oxalat of mercury has the property of exploding with the blow of a hammer. Hence it would appear, that any substance holding oxygen with slight affinity, and at the same time combined with inflammable matter, particularly such as contains hydrogen, may constitute an explosive compound. It is said by Brugnatelli, that a nitrat of silver with excess of acid being heated with alcohol, affords a fulminating substance more violent in its effects than the substance in question. This no doubt arises from the oxygen of the silver giving up less of its specific caloric when it combines with that substance, and of course has more to give up when it combines with the inflammable matter derived from the alcohol. Notwithstanding the mystery so much talked of in the firing of gunpowder, it might no doubt be proved that the light and heat given out when the explosion takes place, is the difference between what would be afforded by the combustion of nitrogen, and the carbon and sulphur of the gunpowder. See *NITRIC Acid*.

M. Bayen was the first chemist who observed the fulminating property of the oxyds of mercury when heated with sulphur; and hence mixtures of this kind have been denominated "Bayen's fulminating mercury." The most powerful of these mixtures is thus prepared; to a solution of nitrat of mercury add lime-water, as long as any precipitate falls down; decant the clear liquor, and wash the pulverulent oxyd with repeated portions of water, after which dry it on a water bath, and then grind it carefully in a mortar, with $\frac{1}{3}$ th of its weight of flower of sulphur. This powder, when laid on a hot iron, explodes with considerable force, undoubtedly in consequence of the sudden oxydation of the mercury, and the rapid combustion of part of the sulphur; for if it is performed in a close vessel, to prevent the dissipation of the powder, the result of its decomposition will be a reddish violet-coloured sulphuret, similar to that procured in the usual manner. Aikin's Dict.

MERCURY, *Incalescent*. See INCALESCENT.

MERCURY, *Ointment of*. See UNGUENT.

MERCURY, *Pills of*. See PILLS.

MERCURY, *Plaster of*. See EMPLASTRUM and PLASTER.

MERCURY, or *Mercury of Bodies*, has been used by alchemists to denote the third of the principles or elements of natural bodies, called also spirit.

In this sense, mercury is defined the most subtle, light, volatile, penetrating, and active part of all bodies. See SPIRIT.

MERCURY of Life, *Mercurius vite*, may, according to Mr. Boyle, be moderated in its evacuating quality, by continually stirring it in a flat glazed earthen vessel, over a fire,

till it emits no fumes, and turns of a grey colour; and he thinks this is the *mercurius vite purgans* so often mentioned by Riverius. Boyle, Works abr. vol. 1. p. 74.

Mr. Godfrey observes, that what is called *mercurius vite*, prepared of sublimate mercury and antimony, has no mercury in it, but is the regulus part of the antimony, with the acid of the sublimate; and what remains is the mercury formed into cinnabar by the sulphur of the antimony. See ALGARDOT.

MERCURY of Metals, or of the *philosophers*, is a pure fluid substance in form of common running mercury, said to be found in all mercury, and capable of being extracted from the same.

The notion of mercury of metals is founded on the common system of the alchemists, that mercury or quicksilver is the basis or matter of all metals; and that metals are only mercury fixed by a certain sulphur.

Mr. Boyle assures us, he had a way of drawing a true running mercury, or quicksilver, from antimony.

MERCURY also serves as a title for books, and papers of news; so called from the heathen deity Mercury, supposed the messenger of the gods.

In the like sense, Mercury is always figuratively applied to persons who make it their business to collect news, or to run about and distribute it.

MERCURY, in *Heraldry*, denotes the purple colour in the coats of sovereign princes. See COLOUR.

MERCURY, in *Mythology*, the son of Jupiter and Maia. He was the god of merchandize, and therefore was sometimes painted with a wand in his left hand, and a bag of money in his right. He was also the god of eloquence, and the messenger of the gods; and, as such, concerned in all treaties of peace and alliance. He is pictured, therefore, with a herald's staff in his hand, entwined with two snakes; wings on his feet, to shew his speed; and a broad-brimmed beaver with wings. He had a general power delegated to him by Jupiter, of conducting the souls of men to their proper place, after their parting from the body; and re-conducting them to our world again, when there was any particular occasion for it. He was, moreover, the god of all gainful arts; whence the proverb *κωνίς έρμης*, i. e. *commune lucrum*; especially of things found by chance, the inventor of the lyre, and of the exercise of wrestling. He was the patron of thieves, having himself been expert that way; and the guide of travellers, for which reason he had statues four-square set up to him in cross-roads. (See TERMINUS.) There are several marks whereby Mercury may be known; among which we may reckon the lightness and agility of his person as the chief; but the most remarkable of his distinguishing attributes are his petasus, or winged cap; the talaria, or wings to his feet; and his wand, with two serpents about it, which they call his caduceus. Sometimes he is also represented with the chlamys, fastened over his shoulders on his breast, and floating behind him in the air. He is likewise distinguished by his sword, with which he killed Argus, called Harpé. As the form of Mercury seems to be all intended for lightness and dispatch, the ancients might borrow this idea of him from his planetary character: thus Lucan, Pharsal. i. v. 663, in speaking of Mercury as the guiding intelligence of a planet, marks the swiftness of its motion.

It has been said, and not without reason, that the Mercury of the Latins was the same deity with the Hermes of the Greeks, the Theutat of the Gauls, and the Thot or Thaut of the Egyptians, from whom some have thought they were derived. His name Hermes signified Interpreter,

or, according to Proclus, Messenger, or, if we trace it to a Celtic original, it was the same with *arines*, which signifies divination, a character which belonged by way of eminence to Mercury, who was distinguished by his knowledge and practice of this art. The Latin appellation was derived, according to Festus, from a term denoting merchants, or rather merchandize, *i. e. Mercurius a Mercibus*; and among the Celts he obtained the name of Merk-ur, on account of his introduction of traffic among them. Lactantius, the grammarian, reckons four of this name, and according to Cicero there were five. Banier allows of none but the ancient Mercury, the Thot, Thaut, or Taaustus of the Egyptians, and the Mercury, who, according to Hesiod, was the son of Jupiter and Maia. To this deity temples were built, and altars erected. There is no personage in profane antiquity more famous than the Egyptian Mercury. Being the soul of Osiris's counsel, he was employed as his agent in the most important offices; and during his absence in India, he assisted Isis, the queen, with his advice, and exerted himself with great assiduity and zeal in causing arts and commerce to flourish through the whole country of Egypt. As he was a proficient in various sciences, he communicated his knowledge to the Egyptians, and established among them a variety of institutions, which contributed to their reputation and prosperity. Such is the account which is given of him by Herodotus and Diodorus Siculus. The second Mercury, or the son of Jupiter and Maia, became famous among the Titan princes, and took possession of Italy, Gaul, Spain, and Mauritania in Africa. This prince is said to have travelled more than once into Egypt, in order to acquaint himself with the arts and sciences, the manners and customs, and particularly the theology and magic of that country. He was thus enabled, upon his return, to instruct his own subjects, and to acquire that high reputation for which he was distinguished, by exhibiting those qualities and performing those services, which we have above recited. After various contests with the other sons of Jupiter, by whom he was repeatedly vanquished, he is said to have retired into Egypt, where he died; though others say he ended his days in Spain, where his tomb was to be seen. Such, says Banier, is the history of Mercury, the Titan prince, which has been much disguised by the Greeks, and blended with several fables. Mercury was worshipped by the Gauls, as Cæsar informs us, but, as we learn from Kircher, (*Œd. Ægypt.*) in Egypt, where the priests consecrated to him the stork, the animal most renowned among them next to the ox. It was chiefly in the month of May that his festival was celebrated, and the most solemn parts of his worship were performed.

The learned Bochart (*Phaleg. l. i. c. 2.*) traces the history of Mercury to that of Canaan. Both, he says, were the sons of Jupiter, or Ammon, who was the same with Ham; one taking his name from *Mercatura*, merchandize, and Canaan, he says, had in Hebrew the same signification. As Canaan was the servant of his brethren, Mercury was the messenger of the gods. This deity had the charge of the highways, because the Phœnicians or Canaanites of the race of Canaan were great travellers, and settled colonies wherever they migrated. The wings of this god are the sails of the Phœnician vessels. He was the god of eloquence, and the inventor of letters, because the Phœnicians brought the use of them into the West. Others represent Mercury as the same with Moses, and compare the miraculous rod of that legislator to the caduceus of this god. Such is the opinion of Huetius.

This pagan divinity had two very distinct names and characters; the Egyptian, known by the title of Hermes,

a grave and venerable personage, who received divine honours on account of his useful and extensive talents for every thing that was conducive to the good of society: the Mercury of the Greeks, on the contrary, was a profligate character; the god of thieves, the intriguing messenger of Jupiter, and useful to him in all his amours. But to both these divinities is ascribed the invention of music and the lyre.

Among the various opinions of the several ancient writers who have mentioned this circumstance, and confined the invention to the Egyptian Mercury, that of Apollodorus is the most intelligible and probable. "The Nile," says this writer, "after having overflowed the whole country of Egypt, when it returned within its natural bounds, left on the shore a great number of dead animals of various kinds, and among the rest, a tortoise, the flesh of which being dried and waisted by the sun, nothing was left within the shell, but nerves and cartilages, and these being braced and contracted by desiccation, were rendered sonorous; Mercury, in walking along the banks of the Nile, happening to strike his foot against the shell of this tortoise, was so pleased with the sound it produced, that it suggested to him the first idea of a lyre, which he afterwards constructed in the form of a tortoise, and strung it with the dried sinews of dead animals."

Of the Grecian Mercury, Horace, Ode x. lib. 1. gives us the best part of his character:

"Thou god of wit, from Atlas sprung,
Who by persuasive power of tongue,
And graceful exercise, refin'd
The savage race of human kind,
Hail! winged messenger of Jove,
And all th' immortal powers above.
Sweet parent of the bending lyre,
Thy praise shall all its sounds inspire.

Artful and cunning to conceal
Whate'er in sportive theft you steal,
When from the god who gilds the pole,
E'en yet a boy, his herds you stole:
With angry voice the threaten'ing pow'r
Bad thee thy fraudulent prey restore,
But of his quiver too beguil'd,
Pleas'd with the theft, Apollo smil'd.

You were the wealthy Priam's guide,
When safe from Agamemnon's pride,
Through hostile camps, which round him spread
Their watchful fires, his way he sped.
Unspotted spirits you consign
To blissful seats and joys divine,
And, powerful with thy golden wand,
The light unbodied crowd command;
Thus grateful does thy office prove
To gods below, and gods above." Francis.

This ode contains the substance of a very long hymn to Mercury, attributed to Homer. See HERMES.

MERCURY Bay, in *Geography*, a bay on the N.E. coast of the northernmost of New Zealand, so called by lieutenant Cook, who anchored here in 1769, examined the adjoining country, and in November of the same year observed the transit of Mercury over the sun, from which planet it derived its name. Southward and northward of this bay, there are several islands, and a small island or rock in the middle of the entrance; within which island the depth of water no where exceeds nine fathoms. The best anchoring is in a sandy bay, which lies just within the south head, in five and four fathoms. This place is very convenient both for wooding and watering, and in the river there is an immense quantity of oysters

oysters and other shell-fish, whence it was called by Cook the "Oyster river." But for a ship that wants to stay here any time, the best and safest place is in the river at the head of the bay, which, from the number of mangrove trees about it, was called "Mangrove river." To sail into this river, the south shore must be kept all the way on board. The country on the east side of the river and bay is very barren; its only produce being fern, and a few other plants that will grow in a poor soil. The land on the N.W. side is covered with wood, and the soil being much more fertile, would, with proper cultivation, produce all the necessaries of life; it is not, however, so fertile as the land observed by our navigators to the southward; nor do the inhabitants, though numerous, make so good an appearance: they have no plantations; their canoes are mean, and without ornament; they sleep in the open air; and say, that Teratu, whose sovereignty they do not acknowledge, if he were to come among them, would kill them. This favoured an opinion of their being outlaws; though they had "Heppahs," or strong holds, to which they retired in time of imminent danger. On the shore, in several parts of the bay, were found great quantities of iron sand, which is brought down by every little rivulet of fresh water, that finds its way from the country; a circumstance which demonstrates that there is ore of that metal not far inland; nevertheless none of the inhabitants of this place, or any other part of the coast, observed by Cook and his companions, knew the use of iron, or set the least value upon it: all of them preferring the most worthless trifle, not only to a nail, but to any tool of that metal. Our navigators, before they left the bay, cut upon one of the trees near the wtering place, the ship's name and that of the commander, with the date of the year, and month when they were there; and after displaying the English colours, took a formal possession of it in the name of his Britannic majesty king George III. S. lat. 36° 47'. W. long. 184° 4'. Hawke's Voyages, vol. ii.

MERCURY Point, a cape on the E. coast of New Zealand, forming the N.E. point of Mercury bay.

MERCURY Isles, a cluster of small islands in the South Pacific ocean, near the E. coast of New Zealand, situated in a line, a little N.E. of Mercury Point.

MERCY, in *Ethics*, has the same general nature and sources as *compassion*, which see; and seems to differ from it only in this, that the object of it has forfeited his title to happiness, or the removal of misery, by some demerit, particularly against ourselves. Here, therefore, resentment on account of an injury done to ourselves, or what is called a just indignation against vice in general, interferes, and checks the otherwise natural course of our compassion, to as, in the unmerciful, entirely to put a stop to it. But in the merciful, the sources of compassion prevail over those of resentment and indignation; whence it appears, that the compassion required in acts of mercy is greater than in common acts of mere compassion; agreeably to which it is observable, that mercy is held in higher esteem than mere compassion. The mercy of God is that attribute of the divine nature, or that modification of benevolence, which respects the misery of mankind in connection with their offences and demerit; and the exercise of it makes provision for their relief by affording them the means of recovery, by repentance and reformation, so that they may become fit objects of pardon and favour.

MERCY, in *Law*. See MISERICORDIA.

MERCY, *Order of our Lady of*, was instituted, for the redemption of captives, as several writers affirm, by James I. king of Arragon, in 1218; but others, on better authority,

attribute the institution of the order to Peter Nolasque, a native of Mar des Saintes Puelles, a town in the diocese of St. Papoule, one league distant from Castellnaudary. The badge worn by the knights at their breast was a small shield per fess gules and or; in chief, a cross pattée argent; in base four pallets gules, for Arragon: the shield crowned with a ducal coronet.

MERCY, *Religious Order of*, is said to have been instituted and liberally endowed, for ladies, in 1261, by Mary du Secours, a woman of quality born at Barce lona: the ladies of this order wore at their breast a small shield of the arms of the order, exactly similar to that worn by the knights.

MERCY-Seat, in *Scripture History*. See *Ark of the Covenant*.

MERDDIN, in *Biography*, the son of Mervyn, a celebrated Welsh poet, who flourished about A. D. 560. He ranked with Merddin Emrys, and Taliesin, as the three principal Christian bards of Britain. Merddin is said to have slain his nephew in battle, on which account he secluded himself from society in a wood, whence he is called Merddin the Wild. Owen's Camb. Biog.

MERDESENGI. See MARDAC.

MERDIN, or MARDIN, in *Geography*, a fortified town of Asiatic Turkey, in the province of Diarbekir. It is situated at the top of a very lofty and rugged mountain, surrounded by a strong and lofty wall of hewn stone, and guarded by a strong fort on the summit of the mountain, furnished with a few cannon. This town is of a considerable size, and very populous. It is the see of a bishop, and the greater part of its inhabitants consists of Armenians, who are very industrious, and carry on several manufactures. They are hospitable and well disposed, enjoy a pure air, and in general appear ruddy and healthy. Many of the women are beautiful. Provisions, and particularly vegetables, are plentiful, good, and cheap; and they have also most kinds of fruits, of excellent quality, the climate being very hot in the vallies, and temperate on the mountains. It is the residence of a pacha, in whose train are 200 spahis and 500 janizaries. This town, which seems to have been called "Zibin" by Rauwolf, was taken and sacked by Timur Bec, but the fortrefs was invincible; 50 miles S. of Diarbekir. N. lat. 37° 19'. E. long. 40°.

MERDIVORÆ, from *merda*, dung, and *voro*, I devour, the *dung-eaters*, in *Natural History*, the name given by authors to several flies, which feed on excrements of different animals. Of these there are three kinds very common among us; 1. The coprophagos, which is of a dun colour, with a reddish head, and a white streak along the middle of it: 2. The red dung-fly, which has silvery wings, a red body, and black shoulders: and, 3. The green one, which is of a very glittering hue, and has silvery wings.

MERDOO, in *Geography*, a town on the N. coast of the island of Sumatra. N. lat. 5°. E. long. 96° 20'.

MERDRIGNAC, a town of France, in the department of the Northern Coasts, and chief place of a canton, in the district of Loudéac; 13 miles E. of Loudéac. The place contains 2134, and the canton 10,044 inhabitants, on a territory of 302½ kilometres, in nine communes.

MERË, a town of Norway, in the government of Drontheim; 68 miles N. of Drontheim.

MERE, a small market-town and parish, situated in the hundred of Mere, and county of Wilts, England. The parish is of an angular shape, and is bounded on two sides by the counties of Somerset and Dorset. Hence it is supposed to have derived its name. *Mere*, in the Saxon language, is often used to denote a boundary or land mark. The appearance of the town is that of a straggling village, the houses

houses being ill arranged and very indifferently built. In the middle of it stands a small cross or market-house, where a weekly market is held on Thursdays, and two fairs annually. According to the parliamentary returns of 1801, it contained 181 houses, and 381 inhabitants. A manufactory of bed-ticking and dowls is carried on here chiefly by the women. The church is an extensive edifice, ornamented at one end by a handsome tower. The living is vicarial, and in the gift of the dean of Salisbury. In the parsonage house was born Francis Potter, one of the most singular mechanical geniuses of his age.

On an eminence still called Castle-hill, immediately adjoining the town, formerly stood a castle, but few traces of its walls can now be discovered. Some encampments appear in this neighbourhood, one of which, called by Leland "White-shole-hill," is surrounded by a double trench, and was probably occupied by the Danish army, previous to some engagement with the celebrated Alfred.

About two miles N.W. of Mere is the parish of Stourton, in which is a noble seat, named Stourhead, the seat of sir R. C. Hoare, bart. This gentleman has distinguished himself in the literary annals of the present age, by the publication of some interesting and handsome works on the topography and antiquities of Great Britain. One of these, entitled "The History of Ancient Wiltshire," contains much new and curious information respecting the characteristics of encampments, barrows, stonehenge, &c. and a particular account of some singular excavations, called Penn-pitts, in this neighbourhood. Stourhead is justly noted among the handsome seats of this county; and though the house has no prominent architectural beauties, yet it is stored with choice pictures, with drawings, and an extensive and well selected library. The pleasure grounds, woods, and water, display many picturesque and sylvan beauties, and the whole demesne is highly impressive and interesting. See Britton's Beauties of Wiltshire.

MERECZ, a town of Lithuania, in the palatinate of Troki, at the conflux of the Merez and the Niemen; 28 miles N. of Grodno.

MEREDITH, CAPE, a cape among the Falkland islands, in the South Atlantic ocean, between port Stephen's and cape Orford.

MEREDITH, a township of America, in Strafford county, New Hampshire, on the S.W. side of lake Winipiscogee; 15 miles N. of Gelmantown, and nine S.E. of Plymouth; incorporated in 1768, and first called New Salem.—Also, a post-town in Delaware county, New York; 25 miles S. of Cooperstown.

MEREEGA, HAMMAM, *i. e.* the baths of Mereega, formerly the "Aquæ Calidæ Colonia," a town of Algiers, in the province of Tlemsan or Tremecen, situated half way betwixt the shelliff and the sea, eight miles E.N.E. of Maliana, and celebrated for its hot baths. The largest and the most frequented of them is a basin 12 feet square, and four deep: and the water, which bubbles up in a degree of heat scarcely supportable, after it has filled this cistern, passes on to a much smaller one used by the Jews, who are not permitted to bathe in company, or in the same place with the Mahometans. These baths were formerly covered, and had corridors surrounding the basins; but they now lie exposed to the weather, and are half filled with stones and rubbish. Nevertheless they are resorted to by a great concourse of people in the spring, which is the season of these waters; accounted very efficacious for curing the jaundice, rheumatic pains, and some of the most inveterate distempers. Higher up the hill is another bath, which being of too intense a heat for bathing, has its water con-

ducted through a long pipe into another chamber, where it is used in "Duccian," an operation similar in its nature and effect with pumping. Betwixt this and the lower bath are the ruins of an old Roman town equal to that of "Herba; and at a little distance from it are tombs and coffins of stone, of an unusual size; 24 miles S.E. of Shershell. Shaw's Travels.

MERENDERA, in *Botany*, a name given by the Spaniards to this plant and some that resemble it, and which may perhaps be tolerated, like a few others of barbarous origin, as being sufficiently harmonious. Ramond Bullet. Philomat. n. 47. 178. t. 12. f. 2. Redout. Liliac. v. 1. 25.—Class and order, *Hexandria Trigynia*. Nat. Ord. *Coronarie*, Linn. *Junci*, Juss.

Cal. Sheath of one leaf. *Cor.* of six petals, funnel-shaped, equal; claws erect, long and linear; borders elliptic-lanceolate, spreading. *Stam.* Filaments six, thread-shaped, equal, inserted into the claws of the petals, shorter than the limb, permanent; anthers terminal, erect, awl-shaped. *Pist.* Germen three-lobed, superior, somewhat stalked, oblong, acute; styles thread-shaped, the length of the stamens; stigmas simple. *Peric.* Capsule stalked, oblong, three-lobed, acute, of three valves and three cells, opening at their inner edge. *Seeds* several in each cell, obovate, stalked, ranged along the margins of each valve.

Est. Ch. Sheath of one valve. Petals six, with long claws. Anthers vertical. Capsule of three cells, opening at their inner edge. Seeds several.

1. *M. Bulbocodium*. Pyrenean Merendera. Redout. Liliac. t. 25. (*Bulbocodium vernum*; Desfort. Atlant. v. 1. 284, excluding the synonyms, according to Redouté, but the description does not entirely agree. *Colchicum montanum minus*, *versicolore flore*; Clus. Hist. v. 1. 201. Ger. em. 160.)—Found in the grassy pastures of the highest of the Pyrenean mountains, flowering at the commencement of autumn, and ripening seed in the following spring. *Root* an ovate bulb. *Stem* none. *Leaves* three or four, produced after the flower is past, radical, spreading, linear, acute, channelled, smooth, a span long. *Flower* solitary, radical, the size of a small *Crocus*, with purplish rose-coloured petals, white at their base, and yellow anthers. *Capsule* small, brown, elevated on a stalk two inches high.—We have copied from Redouté the quotation of Ramond. This plant might perhaps, without violence to nature, be referred to *Colchicum*.

MERETRIX, among the Romans. The meretrices were the better sort of courtezans, and differed much from the *prostitule*, or common prostitutes, who had bills or inscriptions, *tituli*, over their doors, and were ready at all times to entertain their customers, whereas the meretrices entertained none but at night.

The meretrices were distinguished from the matrons by their dress, being obliged to wear the *toga* and short tunics, like those of the men; whereas the matrons wore the *stola*, which was a garment that reached down to their feet, as did likewise their *palla*, or outer robe.

MERÉVILLE, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Corbeil; 10 miles from Estampes. The place contains 1307, and the canton 8012 inhabitants, on a territory of 240 kilometres, in 20 communes.

MERG, a town of Africa; 30 miles N. of Fez.

MERGANSEER, in *Ornithology*, the name of a large water-fowl, called in English the *goosander*, and by some authors the *harle*.

This is the *Mergus merganser* in the Linnæan system: the bill of the male of this species is about three inches

long, narrow, and finely serrated: the colour of the bill as well as of the irides is red; the head is large, and the feathers on the hind part long and loose; the colour black, finely glossed with green; the upper part of the neck the same; the lower part and under side of the body of a fine pale yellow; the upper part of the back and inner scapulars are black; the lower part of the back and tail are ash-coloured; the tail consists of eighteen feathers; the greater quill-feathers are black, the lesser white, some of which are edged with black; the coverts at the setting on of the wings are black; the rest white; and the legs of a deep orange colour. Pennant. See *Mergans*.

MERGEN, a word used by some of the chemical writers to express coral.

MERGENTHEIM, in *Geography*, a town of Germany, on the S. side of the Tauber; the residence of the grand master of the Teutonic order, and seat of the regency; 25 miles S.S.W. of Wurzburg. N. lat. $49^{\circ} 21'$. E. long. $9^{\circ} 27'$.

MERGER, in *Law*, is where a lesser estate in lands, &c. is drowned in the greater; as, if the fee comes to tenant for years or life, the particular estates are merged in the fee: but an estate tail cannot be merged in an estate fee; for no estate in tail can be extinct, by the accession of a greater estate to it. If a lessor, who had the fee, marries with the lessee for years, this is no merger, because he hath the inheritance in his own, and the lease in right of his wife. And where a man hath a term in his own right, and the inheritance descends to his wife, so that he hath a freehold in her right, the term is not merged or drowned.

MERGAN, in *Geography*, a town of Persia, in the province of Segestan; 32 miles S.S.W. of Kin.

MERGUEN HOTUN, a town of Chinese Tartary; 670 miles N.N.E. of Peking. N. lat. $49^{\circ} 12'$. E. long. $142^{\circ} 20'$.

MERGUI, a sea-port town of the kingdom of Siam, situated S. of Tavoy, on an island near the E. coast, with a harbour that is accounted one of the best in India. The sea near the coast being full of islands, is denominated by captain Forrest the Mergui Archipelago. N. lat. $12^{\circ} 6'$. E. long. $98^{\circ} 23'$.

MERGUS, in *Ornithology*, a genus of birds of the order Anseres. The trivial name of this genus is *Merganser*: the bill is toothed, slender, cylindrical, hooked at the point; nostrils small, oval, in the middle of the bill; feet four-toed, the outer toe longest. There are ten species, of which five are common to our country; the others are natives of Europe and America. The birds of this genus live on fish, and are very destructive in ponds.

Species.

CUCULLATUS, Crested Merganser. Crest globular, white on each side; body above brown, beneath white. It inhabits North America; and is 17 inches long; it builds near lakes, forming its nest of grass, and down plucked from its own breast; lays from four to six eggs. The bill and legs are black; irides golden; crest larger than the head, edged with black. The female is brown; crest less, ferruginous.

* **MERGANSER**, Goosander. Subcrested; white head; neck, upper part of the breast, and wings glossy-black; tail cinereous. It weighs about four pounds when full grown; its length is two feet four inches. It is found in Europe, Asia, and America. Sometimes the goosander visits our rivers and lakes in severe winters, but retires to the more northern latitudes to breed. It has been known to build on

trees, like the cormorant, but more frequently among rocks or floeces, and lays 13 eggs, which, with the bird itself, are eagerly devoured by the weazel. It swims with its head above the water; dives deep; remains a long time below, and rises at a considerable distance. Its flesh is rancid, though sometimes eaten. In quest of fish, it dives with great celerity, and holds its slippery prey with great security by means of its toothed bill, so admirably adapted to the purpose. Bill, legs, and irides red; greater quill-feathers black, lesser white.

* **CASTOR**, Dun-diver. Crested, emereous; head and upper part of the neck bay; chin, middle quill-feathers, and belly white. It weighs about two pounds and a half, measures twenty-five inches in length. Inhabits the same countries with the preceding. It has been regarded by some naturalists as the female of another species, but the labyrinth, or enlargement at the bottom of the wind-pipe, seems to others to prove it to be a male, and consequently a distinct species. Bill and irides red; belly sometimes flesh-colour.

* **SERRATOR**, Red-breasted Merganser. Crest pendent; breast variegated with reddish; collar white; tail-feathers brown, varied with cinereous. It inhabits the northern parts of Europe, Asia, and America; and is 21 inches long. The bill beneath and legs are red; feathers of the sides of the breast large, white, edged with black, covering the fore-part of the folded wings. In the *male* the hind-head is crested; head and upper part of the neck green. The *female* is scarcely crested at all; the head and beginning of the neck rufous. There are two other varieties distinguished by differences of colouring marks; the *second* above is black, beneath white; greater quill-feathers black; tail brown; variety of the *male*; the *third* is above black, beneath white; neck bay; wings with a transverse white stripe; greater quill-feathers and tail black; variety of the *female*.

IMPERIALIS, Imperial Goosander. Varied with black, brown, and grey; head smooth; first quill-feathers black; it has no wing-spot; bill and legs reddish-white. It inhabits Sardinia; is the size of a goose; and the tongue fringed.

* **ALBELLUS**, Smew or White Nun. Crest pendent; hind-head black; body white; back and temples black; wings variegated. Inhabits Europe and America; breeds in the Arctic regions, and is driven to the south only by severe weather. Bill and legs black; wing-spot white; oval spot from the bill surrounding the eyes, black, and two arched lines on each side near the beginning of the wings, black. Female, head smooth, grey; band across the eyes black, and under the eyes a white spot; body above blackish-brown, beneath white; upper part of the head bay; chin white.

* **MINUTUS**, Minute Merganser. Brown-ash, beneath and chin white; head and upper part of the neck ferruginous; wing-spot white before and behind. There is a variety having a smooth head; black back; belly white; bill and legs blood-red; first quill-feathers black; tail cinereous.

FURCIFER, Fork-tailed Merganser. Black; head smooth; hind-head, neck, vent, belly, and lateral tail-feathers white; front and cheeks pale brown; the tail is forked. Bill black; dirty-red at the sides; from the ears on each side, through the sides of the neck to the breast, there is a black band.

FUSCUS, Brown Merganser. Crested; brown, beneath white; chin and breast spotted with black; wings black with a white band. It is found in Hudson's bay, and is 17 inches long. Hind-head crested; behind the eyes a white

band extending to the nape; lower part of the crest black; breast blueish waved with whitish; legs yellowish.

CÆRULEUS, Blue Merganser. Crested; blue; crown and tail black; chin, belly, and spot on the wings white. It inhabits Hudson's bay, and is 14 inches long. The bill of this species is long and black; legs are blue. We shall now conclude this article with some general observations on the whole genus.

These birds, with few exceptions, are of a middle size, between that of a goose and of a duck. The edges of both mandibles are serrated, the tongue is thick, set with small bristles pointing backward; an happy contrivance for holding the slippery fishes which form their prey, and conducting it into the bird's throat. They swallow with an undistinguishable voracity, fishes, that are by far too large to enter entire into the stomach; and hence, while the one end is digesting in the œsophagus, the other often remains in the throat.

The head and back of the merganser are black, beautified with a gloss of green. The lower parts of the body are white, the breast tending to a pale yellow. The tail is grey, the eyes, feet, and part of the bill, are red. As this bird is obliged to search for its food by diving, it is capable of remaining a long time under water; and for this purpose, is furnished with a quantity of air, lodged in a cavity of its body, to serve the purpose of respiration while it remains below.

The mergansers, from their voracity, and their expertness in swimming, are perhaps the most destructive of all birds that plunder the waters; while their flesh, which is dry, and of a bad flavour, makes but a small compensation for the devastations which they commit.

Some of them build in trees; but the greater part in rocks, jutting over precipitous forelands. One or two species are said to have been found as high up the North seas as Iceland, but this is uncommon. In all the species, the female is of a smaller size than the male, and differs considerably in the distribution of her colours. Her head is red; and the mantle or back and neck-feathers grey. The white nun is the most beautiful of the whole tribe; the white plumage of the fore parts, and the black mantle that covers its back, are each perfect in their kind; the tuft of small detached feathers white upon the crown, but of a dark green shaded with purple upon the hind part, produces a very elegant effect; while to complete this modest and religious dress of the white nun, the lower part of the neck is half surrounded with a collar of long silky feathers like velvet.

MERCUS cirratus minor, in *Ornithology*, a name by which Gesner calls the *capo negro*, a species of duck, called in English the *tufted duck*.

MERIANA, and **MERIANELLA**, in *Botany*. See **ANTHOLYZA** and **WATSONIA**.

MERIANIA, named by Swartz in memory of Maria Sybilla Merian, daughter of a German engraver, who was born at Frankfort on the Maine, April 12th 1647, and was the wife of John Andrew Graff. This lady is celebrated for her zeal in the pursuit of natural history, especially in what relates to the metamorphoses of insects, and for her great skill in the use of the pencil. She published a work, of which there have been several editions, in folio or quarto, with plates, on European insects, and the plants they feed upon; but her most famous book, detailing the metamorphoses of Surinam insects, is a splendid folio, of which original coloured copies are very rare and valuable. Botany was with her a secondary object, nor are her delineations, however magnificent, always remarkable for accuracy. She

performed several voyages in pursuit of her favourite object. Sir Hans Sloane purchased what were supposed to be her original drawings on vellum, but the copy exhibited in the British Museum, has certainly marks of the graver, though it may have been coloured by her hand. She died at Amsterdam in 1717.—Swartz Ind. Occ. 823. Willd. Sp. Pl. v. 2. 600.—Clafs and order, *Decandria Monogynia*. Nat. Ord. *Calycantbema*, Linn. *Melastoma*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, campanulate, permanent, its margin in five, short, obtuse, membranous segments, each accompanied by a long, external tooth. *Cor.* Petals five, inserted below the throat of the calyx, ovate, somewhat leathery, spreading, deciduous. *Stam.* Filaments ten, fixed internally to the five-sided margin of the calyx, within the petals, broad at the base, bent in the upper part; anthers long, broadish, bent backward, pointed at the summit, opening there by two pores. *Pist.* Germen superior, roundish, five-sided, in the bottom of the calyx; style thick, club-shaped, bent downward; stigma obtuse. *Peric.* Capsule in the bottom of the bell-shaped calyx, covered by the calyx; but unconnected with it, naked above, roundish, five-sided, five-celled, five-valved; the partitions contrary to the valves. *Seeds* numerous, minute. *Recept.* crescent-shaped.

Eff. Ch. Calyx bell-shaped, five-cleft. Petals five, inserted into the calyx. Stamens declining. Capsule distinct, of five cells; the partitions contrary to the valves. Seeds numerous.

1. *M. leucantha*. White-flowered Meriania. Swartz Ind. Occ. 826. t. 15. f. a. (*Rhexia leucantha*; Swartz Prod. 61.)—Leaves oblong, shining. Flowers with two bracteas.—Native of the highest mountains of Jamaica, flowering in the summer and autumn.—This is a shining, elegant tree, whose straight trunk, covered with a smooth bark, is from 15 to 30 feet in height. Branches erect, roundish, smooth; smaller ones quadrangular, compressed, furrowed, brittle. Leaves opposite, crossing each other in pairs, ovate-oblong, pointed, three-nerved, toothed and cartilaginous at the margin, paler, and beautifully veined like net-work beneath; smooth on both sides; very shining, four or five inches long; on angulated smooth footstalks which are channelled above. Flower-stalks at the axils of the terminal leaves, opposite, solitary, remote, an inch and a half long, round, compressed, erect, single-flowered, smooth. Bracteas two, opposite, nearly sessile, ovate-lanceolate, pointed, entire, three-nerved, pale. Flowers large and handsome, white, or slightly flesh-coloured, inodorous, somewhat drooping.

2. *M. purpurea*. Purple Meriania. Swartz Ind. Occ. 829. t. 15. f. b. (*Rhexia purpurea*; Swartz Prod. 61.)—Leaves ovate-lanceolate. Flowers with four bracteas.—Grows in similar situations to the last, and flowers in autumn. The present species differs chiefly from *M. leucantha* in being considerably smaller, in having its leaves of a brownish-green, its smaller branches round, not quadrangular, and its flowers of a deep blood or purple colour, accompanied by four bracteas instead of two. The corolla in each species is as large as that of a single wild rose. We find the second species, in the herbarium of the younger Linnæus, marked *Wrightia superba*, and we recollect to have seen the same name at Sir Joseph Banks's, which, when the genus was established, ought to have been retained in justice to a very indefatigable collector and botanist who first sent the specimens to Europe, Dr. Wm. Wright, now of Edinburgh.

MERJAPOUR, in *Geography*, a town of Hindoostan, in Bahar; 28 miles S.S.W. of Bahar.

MERI-

MERIBASA, a river of Asiatic Turkey, which runs into the Mediterranean, near Adana.

MERICHSWAND, a fertile tract of Switzerland, in the canton of Lucerne, four miles long, and two broad, separated from the rest of the canton. In it is a parochial village near the Ruz.

MERIDA, an ancient town of Spain, in Estremadura, seated on an eminence, near the Guadiana. It was anciently large, populous, and flourishing, and much embellished by the Romans, so that it now only presents an image of its former grandeur and magnificence. This town became a colony under the emperor Augustus, and being peopled, after the war with the Cantabrians, with soldiers of the 5th and 10th legions, took the name of that prince, and was called "Emerita Augusta." (See AUGUSTA.) Writers differ about its extent; some assigning to it eight miles, and others six leagues of circumference. It was, however, the largest in Spain, under the Romans. Under the dominion of the Goths, it preserved its monuments; but when it was taken by the Moors, A.D. 713, it was very much ransacked and destroyed. From then it was retaken by Alphonso IX., king of Castile and Leon, in 1230; and from that period it has been always attached to the kingdom of Castile. It lies in that part of Spain which the Romans called Vetonia; but notwithstanding its former extent and populousness, the number of its present inhabitants scarcely amounts to 5000. Under the Gothic kings it was the see of an archbishop, and the seat of some provincial councils. The archiepiscopal see was removed to Compostella by pope Calixtus II., under king Alphonso VII., whilst this town was in the possession of the Moors. When it was retaken by Alphonso IX., he gave it to the military order of St. James, and it still belongs to this order. Merida took as arms the reverse of a medal struck under Augustus for commemorating its erection into a Roman colony; this is a gate of a town formed by two arches with two towers, and a semicircular enclosure, which extended from one to the other. It still affords considerable wrecks of its ancient magnificence under the Romans. Here they built superb bridges and magnificent temples; triumphal arches and beautiful aqueducts; here they raised edifices for public feasts and games; a circus, a theatre, and a naumachia. The vestiges of these grand public monuments are still visible; of which some are in and others out of the town. The baths are in a better state of preservation than most of the other monuments. In its vicinity are two large reservoirs of water, resembling lakes, called Albafera and Albuera. One is 90 feet long, and 51 deep, surrounded by thick walls, and ornamented with two beautiful towers; about a league from the town. The other is at the distance of two leagues; it is small, but the walls which contain the waters, and the great tower which serves as an aperture for air, are much finer. The environs of Merida are pleasant and fertile; abounding in wine, good fruits, and grain, with excellent pasture; nine leagues from Badajoz. N. lat. $38^{\circ} 48'$. W. long. $6^{\circ} 3'$.

MERIDA, the capital of Yucatan, in the audience of Mexico; lying near the N. side of the province between the gulfs of Mexico and Honduras; the residence of a governor, and see of a bishop; 130 miles N.E. of Campeachy. N. lat. $21^{\circ} 38'$. W. long. $90^{\circ} 36'$.—Also, a town of South America, in the government of Caraccas, founded in 1558 by John Rodriguez Suarez, under the name of Santiago de los Caballeros, and situated in a valley three leagues long, and about three quarters of a league wide in its broadest part. It is surrounded by three rivers, Mucujun, Albarregas, and Chama, neither of which is navigable. At some distance from the city are plantations of sugar, cacao, and

coffee. All the environs of Merida abound with fruits, maize, beans, peas, potatoes, cassada, wheat of the finest quality, barley, &c. Excellent meat is purchased here at a very moderate price. The climate is variable, so that every day it experiences the four seasons of the year. The west wind is particularly insalubrious; the rains are heavy, and fall through the year, but with peculiar violence from the month of March to November. This city is the see of a bishop and a chapter. It possesses a college and seminary for the education of ministers who conduct the Catholic worship; and for other classes of inhabitants. The orders of St. Dominic and of St. Augustin, and also of St. Clair, have each a convent; and besides the cathedral, they have several places of worship. The number of inhabitants at Merida amounts to 11,500, of all colours and of all classes. No class here disdains labour; the white are employed in agriculture, the rearing of cattle, and the offices of the ecclesiastical state. The people of colour fabricate different articles of cotton and wool. Merida is distant from Maracaibo 80 leagues to the S.; from Caraccas 140 leagues to the S.E., and from Varinas 25 leagues S.E. N. lat. $8^{\circ} 10'$. W. long. $73^{\circ} 45'$.

MERIDIAN, in *Astronomy*, a great circle of the sphere, passing through the zenith, nadir, and poles of the world, crossing the equinoctial at right angles, and dividing the sphere into two hemispheres, the one eastern, and the other western.

It is called meridian, from the Latin *meridies*, noon, or mid-day, because when the sun is in this circle, it is noon in those places situated under it.

MERIDIAN, in *Geography*, is a great circle, as P A Q D, (Plate 1. *Geography*, fig. 9.) passing through the poles of the earth P and Q: and any given place at Z. So that the plane of the terrestrial meridian is in the plane of the celestial one.

Hence, 1, as the meridian invests the whole earth, there are several places situated under the same meridian. And, 2, as it is noon-tide whenever the centre of the sun is in the meridian of the heavens; and as the meridian of the earth is in the plane of the former; it follows, that it is noon at the same time, in all places situate under the same meridian. 3. There are as many meridians on the earth as there are points conceived in the equator. In effect, the meridians always change, as you change the longitude of the place; and may be said to be infinite; each respective place from east to west having its respective meridian.

MERIDIAN, *Firß*, is that from which the rest are accounted, reckoning from west to east. The first meridian is the beginning of longitude.

The fixing of the first meridian is a matter merely arbitrary; and hence different persons, nations, and ages, have fixed it differently; whence some confusion has arisen in geography. The rule among the ancients was, to make it pass through the place farthest to the west that was known. But the moderns knowing that there is no such place in the earth as can be esteemed the most westerly, the way of computing the longitudes of places from one fixed point is much laid aside.

Ptolomy assumed the meridian that passes through the farthest of the Canary islands as his first meridian; that being the most western place of the world then known. After him, as more countries were discovered in that quarter, the first meridian was removed farther off. The Arabian geographers chose to fix the first meridian upon the utmost shore of the western ocean. Some fixed it to the island of St. Nicholas, near Cape Verd; Hondius to the isle of St. James; others to the island of Del Corvo, one of the

Azores; because on that island the magnetic needle, at that time, pointed directly north, without any variation; and it was not then known that the variation of the needle is itself subject to variation. The latest geographers, particularly the Dutch, have pitched on the Pike of Teneriffe; others on the isle of Palm, another of the Canaries; and, lastly, the French, by command of their king, on the island of Ferro, another of the Canaries.

But, without much regard to any of these rules, our geographers and map-makers frequently assume the meridian of the place where they live, or the capital of their country, for a first meridian; and thence reckon the longitudes of their places.

The astronomers in their calculations usually choose the meridian of the place where their observations are made, for their first meridian; as Ptolemy, at Alexandria; Tycho Brahe, at Uranibourg; Riccioli, at Bologna; Mr. Flamsteed, at the Royal Observatory at Greenwich; and the French, at the Observatory at Paris.

MERIDIAN of a Globe, or Sphere, is the brazen circle in which the globe hangs and turns. See **GLOBE**.

It is divided into four nineties, or three hundred and sixty degrees, beginning at the equinoctial: on it, each way, from the equinoctial, on the celestial globe, is counted the fourth and north declination of the sun or stars; and on the terrestrial globe, the latitude of places north and south. There are two points on this circle, called the *poles*; and a diameter, continued from thence through the centre of either globe, is called the axis of the earth, or heavens, on which they are supposed to turn round.

On the terrestrial globes there are usually thirty-six meridians drawn, one through every tenth degree of the equator, or through every tenth degree of longitude.

The uses of this circle are, to set the globes to any particular latitude, to shew the sun's or a star's declination, right ascension, greatest altitude, &c.

MERIDIAN Line, an arc, or part of the meridian of the place, terminated each way by the horizon.

Or, a meridian line is the intersection of the plane of the meridian of the place with the plane of the horizon, vulgarly called a *north and south line*, because its direction is from one pole towards the other.

The use of a meridian line in astronomy, geography, dialling, &c. is very great, and on its exactness all depends; whence infinite pains have been taken by divers astronomers to fix it to the utmost precision. M. Cassini has distinguished himself by a meridian line drawn on the pavement of the church of S. Petronio, at Bologna, the largest and most accurate in the world; being 120 feet in length. In the roof of this church, a thousand inches above the pavement, is a little hole, through which the sun's image, when in the meridian, falling upon the line, marks his progress all the year. When finished, M. Cassini, by a public writing, informed the mathematicians of Europe, of a new oracle of Apollo, or the sun, established in a temple, which might be consulted, with entire confidence, as to all difficulties in astronomy. See **GNOMON**.

To draw a Meridian Line.—Knowing the fourth quarter pretty nearly, observe the altitude FE (*Plate XVII. Astronomy, fig. 3.*) of some star on the eastern side thereof, not far from the meridian HZRN: then, keeping the quadrant firm on its axis, so as the plummet may still cut the same degree, only directing it to the western side of the meridian, wait till you find the star has the same altitude as before, *f, e.* Lastly, bisect the angle E C e, formed by the intersection of the two planes wherein the quadrant

is placed at the time of the two observations, by the right line H R. This H R is a meridian line.

Or thus: on the horizontal plane, from the same centre C (*fig. 4.*) describe several arcs of circles BA, *ba*, &c. and on the same centre, C, erect a style, or gnomon, perpendicular to the plane A C B, a foot or half a foot long. About the twenty-first of June, between the hours of nine and eleven in the morning, and between one and three in the afternoon, observe the points B, *b*, &c. A, *a*, wherein the shadow of the style terminates. Bisect the arcs A B, *ab*, &c. in D, *d*, &c. If then the same right line D E bisect all the arcs A B, *ab*, &c. it will be the meridian line sought.

As it is difficult to determine the extremity of the shadow exactly, it is best to have the style flat at top, and to drill a little hole, noting the lucid spot projected by it on the arcs A B and *ab*, instead of the extremity of the shadow. Otherwise the circles may be made with yellow, instead of black, &c.

A good meridian line for regulating clocks and watches may be had by the following method: make a round hole, almost a quarter of an inch in diameter, in a thin plate of metal; and fix the plate in the top of a fourth window in such a manner, that it may recline from the zenith at an angle equal to the co-latitude of your place, as nearly as you can guess; for then the plate will face the sun directly at noon on the equinoctial days. Let the sun shine freely through the hole into the room, previously darkened; and hang a plumb-line to the ceiling of the room, at least five or six feet from the window, in such a place as that the sun's rays, transmitted through the hole, may fall upon the line when it is noon by the clock; and having marked the said place on the ceiling, take away the line. Having adjusted a sliding-bar to a dove-tail groove, in a piece of wood about eighteen inches long, and fixed a hook into the middle of the bar, nail the wood to the above-mentioned place in the ceiling, parallel to the side of the room in which the window is; the groove and bar being towards the floor. Then hang the plumb-line upon the hook in the bar, the weight or plummet reaching almost to the floor: when this is done, find the true solar time, and thereby regulate your clock or watch. Then, at the moment of next noon by the clock, when the sun shines, move the sliding-bar in the groove until the shadow of the plumb-line bisects the image of the sun on the floor, wall, or on a white screen placed on the north side of the line; the plummet, or weight at the end of the line, hanging freely in a pail of water, placed below it on the floor. By repeated corrections, on the following days, with the sun and clock, this method may be brought to a very great exactness. This meridian line will not only be sufficient for the regulation of clocks and watches, to the true mean time, by equation tables, but also for most astronomical purposes. Ferguson's *Lect. on select Subjects*, &c. *lect. x.*

Several authors have invented particular instruments and methods for the describing of meridian lines, or rather for determining equal altitudes of the sun in the eastern and western parts of the heavens; as Mr. Grey, Dr. Derham, &c. in the *Philosophical Transactions*. But as the former of the methods above delivered suffices for astronomical observations, and the latter for more ordinary occasions, we shall forbear to give any descriptions of them.

From what has been shewn, it is evident, that whenever the shadow of the style covers the meridian line, the centre of the sun is in the meridian; and, therefore, it is then noon. And hence the use of a meridian line in adjusting the motion of clocks, &c. to the sun.

Hence .

Hence also, if the meridian line be bisected by a right line O V, drawn perpendicularly through the point C, O V will be the intersection of the meridian, and first vertical; and, consequently, O will shew the east point, and V the west.

Lastly, if a style be erected perpendicularly in any other horizontal plane, and a signal be given when the shadow of the style covers the meridian line drawn in another plane, noting the apex, or extremity, of the shadow projected by the style, a line drawn from that point through that wherein the style is raised, will be a meridian line.

One meridian line being given, another may be drawn upon another horizontal plane by the following method: hang a thread with a plummet exactly over the south end of the meridian line given, and another thread with a plummet over the south end of the plane upon which the meridian line is to be drawn; let one person observe at noon the moment when the shadow of the first thread falls exactly upon the meridian given, and let another observer, at the same time, mark two distant points in the shadow of the second thread: a line drawn through those points is the meridian line required. By the same method may a meridian line be found upon a south wall, by making two points in the shadow of a thread hung at a little distance from it: if the meridians are near, he that observes the shadow of the first thread, may let the other know the moment it falls upon the meridian line, by saying *now*: if they are far distant, it should be done by the motion of the hand, because sound takes some time to pass from one place to another. The meridian line is the basis of astronomical observations: a meridian line being found, there may be placed over it a quadrant or sextant in such a manner, that though it be moved up or down to give it different elevations, in order to view through the sights of it the celestial bodies at their different altitudes; yet the plane of that side of the instrument upon which the degrees are marked shall continue all the while in the plane of the meridian. Of this kind is the mural arc in the royal observatory at Greenwich. See **MERIDIAN Altitude**.

MERIDIAN Line, on a dial, is a right line arising from the intersection of the meridian of the place with the plane of the dial. This is the line of twelve o'clock, and from hence the division of the hour-line begins.

MERIDIAN, Magnetical, is a great circle, passing through or by the magnetical poles; to which the magnetic needle, or needle of the mariner's compass, if not otherwise hindered, conforms itself.

MERIDIAN Altitude of the sun or stars is, their altitude when in the meridian of the place where they are observed. See **ALTITUDE**.

To take the Meridian Altitude of the Stars.—Astronomers make two principal kinds of observations of the stars, the one when they are in the meridian, and the other when in vertical circles.

For meridian observations there are two instruments principally used, the quadrant and gnomon.

To take the Meridian Altitude with a Quadrant.—If the position of the meridian be known, and the plane of an astronomical quadrant be placed in the meridian line, by means of the plumb-line suspended at the centre, the meridian altitudes of the stars, which are the principal observations whereon the whole art of astronomy is founded, may easily be determined.

The meridian altitude of a star may likewise be had by means of a pendulum-clock, if the exact time of the star's passage by the meridian be known. Now it must be observed, that the stars have the same altitude for a minute

before and after their passage by the meridian, if they be not in or near the zenith; but if they be, their altitudes must be taken every minute, when they are near the meridian; and then their greatest altitudes will be the meridian altitudes sought.

As to the manner of observing, it is found very difficult to place the vane of the quadrant in the meridian exact enough to take the meridian altitude of a star; for, unless there be a convenient place, and a wall, where the quadrant may be firmly fastened in the plane of the meridian, which is not easily had, we shall not have the true position of the meridian proper to observe the stars. It will be much easier, therefore, on several accounts, to use the portable quadrant, by which the altitude of the star may be observed a little before its passage over the meridian, every minute, till its greatest altitude be found. Here, though we have not the true position of the meridian by this means, yet we have the apparent meridian altitude of the star.

Though this method, in the general, be very good, and free from any sensible error; yet, in case a star passes by the meridian near the zenith, it proves somewhat defective: for in these kinds of observations, the inconvenient situation of the observer, the variation of the star's azimuth several degrees in a little time, the alteration of the instrument, and the difficulty of replacing it vertically, will prevent the observations being made oftener than in every four minutes; but in each minute the altitude varies about 15 minutes of a degree, so that there will be the difference of a degree in the star's altitude between each observation. In such cases, therefore, it will be better to have the true position of the meridian, or the exact time wherein the star passes the meridian, in order either to place the instrument in the meridian, or to observe the altitude of the star the moment it passes the meridian.

To find the Meridian Altitude of the Sun, &c. by a Gnomon, see **GNOMON**. By other means, see **ALTITUDE**.

MERIDIAN Telescope. See **TELESCOPE**.

To measure the Degrees of the Meridian, see **DEGREE**.

To observe the Transits or Passages of the heavenly Bodies across the Plane of the Meridian.—A meridian line being found, hang two threads with plummets exactly over it, at a little distance from one another, and they will be in the plane of the meridian: if you place your eye close to one of the threads in such a manner that you make it cover the other, and both appear as one thread; when a star is behind the threads, it is in the meridian. By the same method the sun may be viewed through a smoked glass; when the threads pass through his centre, he is in the meridian: but the best way of observing the sun, moon, stars, or planets, is through a telescope placed in the meridian, with two cross hairs, one of which is in a vertical, the other in a horizontal position; when the vertical hair passes through the centre of the sun, he is in the meridian.

MERIDIAN, from *Meridies*, the hour for sleeping, which was allowed to the ancient monks, in this and other countries, about noon, during the summer months.

MERIDIANI, in *Antiquity*, is a name which the Romans gave to a kind of gladiators, who entered the arena about noon, after the bestiarii (who fought in the morning against beasts) had finished. See **GLADIATOR**.

They were thus called from *meridies*, i. e. *noon*, the time when they exhibited their shows.

The meridiani were a sort of artless combatants, who fought man with man, sword in hand: hence Seneca takes occasion to observe, that the combats of the morning were full of humanity, compared with those which followed.

MERIDIONAL DISTANCE, in *Navigation*, the same with departure, or casting and wetting; being the difference of longitude between the meridian, under which the ship now is, and any other meridian, which she was under before.

MERIDIONAL Parts, Miles, or Minutes, are the parts by which the meridians in a Mercator's chart increase, as the parallels of latitude decrease.

The cosine of the latitude of any place being equal to the radius, or semidiameter, of that parallel; therefore, in the true sea-chart, or nautical planisphere, this radius being the radius of the equinoctial, or whole sine, of 90 degrees, the meridional parts at each degree of latitude must increase, as the secants of the arc contained between that latitude, and the equinoctial decrease.

In order to understand this, it is necessary to consider, 1. That the distance between any two meridians at the equator is to their distance in any parallel of latitude as radius is to the cosine of that latitude. Let P D F E (*Plate I. Navigation, fig. 8.*) represent the fourth part of a sphere; E being the centre, P the pole, E D the radius of the equator, A B the radius of a parallel of latitude: then each of the arcs P B D, P C d, will represent a quadrant of a meridian; D d an arc of the equator; and B C an arc of a parallel of latitude: D B expresses the latitude, and P B the complement of the latitude, whose right sine is B A. But the circumference of a circle, whose radius is E D, is to the circumference of a circle, whose radius is A B, and consequently like arcs D d, B C, intercepted between the same two meridians, as E D is to A B, *i. e.* as radius to the cosine of the latitude. Whence it is easy to construct a table shewing in what proportion the degrees of longitude diminish in every latitude. See such a table under article **DEGREE of Latitude**.

2. Any part of a parallel of latitude is to a like part of a meridian, as radius is to the secant of the latitude of that parallel. Let P D E (*Plate I. Navigation, fig. 9.*) represent a quadrant of a meridian, where P is the pole, and D E the radius of the equator; A B is the radius of a parallel of latitude, or the cosine of the latitude, whose sine is B F, and secant E C. Then E F : E B :: E D : E C; or cosine latitude: rad. : : rad.: secant of the latitude, in that parallel. Therefore, part of a parallel of latitude is to a like part of the equator as the radius is to the secant of the latitude to that parallel: consequently, since like parts of the meridian and equator are equal, as great circles, any part of a parallel of latitude is to a like

part of a meridian, as radius to the secant of the latitude to that parallel.

3. The distance of any parallel of latitude, A, from the equator, is expressed by the sum of the secants of all the arcs between the equator and that parallel. For, as radius to the secant of the latitude A, so is a diminished degree of longitude in the latitude A, or a degree of that parallel, to a degree of the meridian: but the degrees of latitude, or of the meridian, are to be lengthened in proportion as the degrees of longitude decrease: therefore, as radius to the secant of the latitude A, so is a natural degree of the meridian to a lengthened degree in the latitude A, radius being here as unity, and one natural degree as unity also: therefore, the length of a degree in any latitude is as the secant of that latitude, or may be expressed by that secant: but the distance of any parallel from the equator is the sum of all the successive arcs between the equator and that parallel: consequently, the distance of that parallel is expressed by the sum of the secants of all these arcs between the equator and that parallel of latitude: and, therefore, by the addition of the secants of small arcs, the distances of the parallels of latitude from the equator are obtained.

The tables, therefore, of meridional parts, in books of navigation, are to be made by a continual addition of secants, calculated in some books, as in sir Jonas Moor's Tables, Robertson's Navigation, &c. for every degree and minute of latitude; and these will serve either to make or graduate a Mercator's chart, or to work the Mercator's sailing.

Mr. Wright, to whom we are indebted for this excellent discovery, made his table for the division of the nautical meridian, or the table of meridional parts, as follows: the meridional parts for 1 minute he made equal to the secant of 1 minute; those of 2' equal to the sum of the secants of 1' and 2'; those of 3' equal to the sum of the secants of 1', 2', and 3'; those of 4' equal to the sum of the meridional parts of 3' and the secant of 4'; and so on by a constant addition of the secants: Mr. Oughtred, sir Jonas Moor, Dr. Wallis, Dr. Halley, and others, have endeavoured to find methods of constructing these tables with greater accuracy than by the addition of the secants to every minute. As the reader may not have immediate access to such a table, we have here annexed one, extracted from Robertson's "Elements of Navigation."

The following is a Table of meridional parts to every degree and minute of the quadrant, established on a supposition that the earth is a perfect sphere.

MERIDIONAL PARTS.

D. l.	0	1	2	3	4	5	6	7	8	9	10	11	12	D. l.
min.	M. P.	min.												
0	0.0	60.0	120.0	180.1	240.2	300.4	360.7	421.1	481.6	542.2	603.1	664.1	725.3	0
1	1.0	61.0	121.0	181.1	241.2	301.4	361.7	422.1	482.6	543.3	604.1	665.1	726.4	1
2	2.0	62.0	122.0	182.1	242.2	302.4	362.7	423.1	483.6	544.3	605.1	666.1	727.4	2
3	3.0	63.0	123.0	183.1	243.2	303.4	363.7	424.1	484.6	545.3	606.1	667.1	728.4	3
4	4.0	64.0	124.0	184.1	244.2	304.4	364.7	425.1	485.6	546.3	607.1	668.1	729.4	4
5	5.0	65.0	125.0	185.1	245.2	305.4	365.7	426.1	486.6	547.3	608.2	669.2	730.5	5
6	6.0	66.0	126.0	186.1	246.2	306.4	366.7	427.1	487.6	548.3	609.2	670.2	731.5	6
7	7.0	67.0	127.0	187.1	247.2	307.4	367.7	428.1	488.6	549.3	610.2	671.2	732.5	7
8	8.0	68.0	128.0	188.1	248.2	308.4	368.7	429.1	489.6	550.3	611.2	672.2	733.5	8
9	9.0	69.0	129.0	189.1	249.2	309.4	369.7	430.1	490.7	551.4	612.2	673.2	734.5	9
10	10.0	70.0	130.0	190.1	250.2	310.4	370.7	431.1	491.7	552.4	613.2	674.3	735.6	10
11	11.0	71.0	131.0	191.1	251.2	311.4	371.7	432.1	492.7	553.4	614.2	675.3	736.6	11
12	12.0	72.0	132.0	192.1	252.2	312.4	372.7	433.1	493.7	554.4	615.3	676.3	737.6	12
13	13.0	73.0	133.0	193.1	253.2	313.4	373.7	434.2	494.7	555.4	616.3	677.3	738.6	13
14	14.0	74.0	134.0	194.1	254.2	314.4	374.7	435.2	495.7	556.4	617.3	678.4	739.6	14
15	15.0	75.0	135.0	195.1	255.2	315.4	375.7	436.2	496.7	557.4	618.3	679.4	740.7	15
16	16.0	76.0	136.0	196.1	256.2	316.4	376.8	437.2	497.7	558.4	619.3	680.4	741.7	16
17	17.0	77.0	137.0	197.1	257.2	317.5	377.8	438.2	498.7	559.4	620.3	681.4	742.7	17
18	18.0	78.0	138.0	198.1	258.2	318.5	378.8	439.2	499.8	560.5	621.3	682.4	743.7	18
19	19.0	79.0	139.0	199.1	259.2	319.5	379.8	440.2	500.8	561.5	622.4	683.4	744.8	19
20	20.0	80.0	140.0	200.1	260.2	320.5	380.8	441.2	501.8	562.5	623.4	684.5	745.8	20
21	21.0	81.0	141.0	201.1	261.3	321.5	381.8	442.2	502.8	563.5	624.4	685.5	746.8	21
22	22.0	82.0	142.0	202.1	262.3	322.5	382.8	443.2	503.8	564.5	625.4	686.5	747.8	22
23	23.0	83.0	143.0	203.1	263.3	323.5	383.8	444.2	504.8	565.5	626.4	687.5	748.9	23
24	24.0	84.0	144.0	204.1	264.3	324.5	384.8	445.2	505.8	566.6	627.4	688.5	749.9	24
25	25.0	85.0	145.0	205.1	265.3	325.5	385.8	446.3	506.8	567.6	628.5	689.6	750.9	25
26	26.0	86.0	146.0	206.1	266.3	326.5	386.8	447.3	507.8	568.6	629.5	690.6	751.9	26
27	27.0	87.0	147.0	207.7	267.3	327.5	387.8	448.3	508.9	569.6	630.5	691.6	753.0	27
28	28.0	88.0	148.0	208.1	268.3	328.5	388.8	449.3	509.9	570.6	631.5	692.6	754.0	28
29	29.0	89.0	149.0	209.1	269.3	329.5	389.8	450.3	510.9	571.6	632.5	693.6	755.0	29
30	30.0	90.0	150.0	210.1	270.3	330.5	390.8	451.3	511.9	572.6	633.5	694.7	756.0	30
31	31.0	91.0	151.0	211.1	271.3	331.5	391.8	452.3	512.9	573.7	634.6	695.7	757.1	31
32	32.0	92.0	152.0	212.1	272.3	332.5	392.9	453.3	513.9	574.7	635.6	696.7	758.1	32
33	33.0	93.0	153.1	213.1	273.3	333.5	393.9	454.3	514.9	575.7	636.6	697.7	759.1	33
34	34.0	94.0	154.1	214.1	274.3	334.5	394.9	455.3	515.9	576.7	637.6	698.7	760.1	34
35	35.0	95.0	155.1	215.1	275.3	335.5	395.9	456.3	516.9	577.7	638.6	699.8	761.1	35
36	36.0	96.0	156.1	216.1	276.3	336.5	396.9	457.3	518.0	578.7	639.6	700.8	762.2	36
37	37.0	97.0	157.1	217.1	277.3	337.5	397.9	458.4	519.0	579.7	640.7	701.8	763.2	37
38	38.0	98.0	158.1	218.1	278.3	338.5	398.9	459.4	520.0	580.8	641.7	702.8	764.2	38
39	39.0	99.0	159.1	219.1	279.3	339.6	399.9	460.4	521.0	581.8	642.7	703.8	765.2	39
40	40.0	100.0	160.1	220.2	280.3	340.6	400.9	461.4	522.0	582.8	643.7	704.9	766.3	40
41	41.0	101.0	161.1	221.2	281.3	341.6	401.9	462.4	523.0	583.8	644.7	705.9	767.3	41
42	42.0	102.0	162.1	222.2	282.3	342.6	402.9	463.4	524.0	584.8	645.8	706.9	768.3	42
43	43.0	103.0	163.1	223.2	283.3	343.6	403.9	464.4	525.0	585.8	646.8	707.9	769.3	43
44	44.0	104.0	164.1	224.2	284.3	344.6	404.9	465.4	526.0	586.8	647.8	709.0	770.4	44
45	45.0	105.0	165.1	225.2	285.3	345.6	405.9	466.4	527.1	587.9	648.8	710.0	771.4	45
46	46.0	106.0	166.1	226.2	286.3	346.6	407.0	467.4	528.1	588.9	649.8	711.0	772.4	46
47	47.0	107.0	167.1	227.2	287.3	347.6	408.0	468.4	529.1	589.9	650.8	712.0	773.4	47
48	48.0	108.0	168.1	228.2	288.3	348.6	409.0	469.5	530.1	590.9	651.9	713.0	774.5	48
49	49.0	109.0	169.1	229.2	289.3	349.6	410.0	470.5	531.1	591.9	652.9	714.1	775.5	49
50	50.0	110.0	170.1	230.2	290.3	350.6	411.0	471.5	532.1	592.9	653.9	715.1	776.5	50
51	51.0	111.0	171.1	231.2	291.3	351.6	412.0	472.5	533.1	593.9	654.9	716.1	777.5	51
52	52.0	112.0	172.1	232.2	292.4	352.6	413.0	473.5	534.1	595.0	655.9	717.1	778.6	52
53	53.0	113.0	173.1	233.2	293.4	353.6	414.0	474.5	535.1	596.0	657.0	718.2	779.6	53
54	54.0	114.0	174.1	234.2	294.4	354.6	415.0	475.5	536.2	597.0	658.0	719.2	780.6	54
55	55.0	115.0	175.1	235.2	295.4	355.6	416.0	476.5	537.2	598.0	659.0	720.2	781.7	55
56	56.0	116.0	176.1	236.2	296.4	356.6	417.0	477.5	538.2	599.0	660.0	721.2	782.7	56
57	57.0	117.0	177.1	237.2	297.4	357.6	418.0	478.5	539.2	600.0	661.0	722.3	783.7	57
58	58.0	118.0	178.1	238.2	298.4	358.6	419.0	479.5	540.2	601.0	662.1	723.3	784.7	58
59	59.0	119.0	179.1	239.2	299.4	359.6	420.0	480.5	541.2	602.1	663.1	724.3	785.8	59
min.	M. P.	min.												
D. l.	0	1	2	3	4	5	6	7	8	9	10	11	12	D. l.

MERIDIONAL PARTS.

D. l.	13	14	15	16	17	18	19	20	21	22	23	24	25	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	786.8	848.5	910.5	972.8	1035.3	1098.2	1161.5	1225.1	1289.2	1353.7	1418.6	1484.1	1550.0	0
1	787.8	849.5	911.5	973.8	1036.3	1099.3	1162.5	1226.2	1290.3	1354.8	1419.7	1485.2	1551.1	1
2	788.8	850.5	912.6	974.8	1037.4	1100.3	1163.6	1227.3	1291.3	1355.8	1420.8	1486.3	1552.2	2
3	789.9	851.6	913.6	975.9	1038.4	1101.4	1164.7	1228.3	1292.4	1356.9	1421.9	1487.3	1553.3	3
4	790.9	852.6	914.6	976.9	1039.5	1102.4	1165.7	1229.4	1293.5	1358.0	1423.0	1488.4	1554.4	4
5	791.9	853.6	915.7	978.0	1040.5	1103.5	1166.8	1230.4	1294.5	1359.0	1424.1	1489.5	1555.5	5
6	792.9	854.7	916.7	979.0	1041.6	1104.5	1167.8	1231.5	1295.6	1360.2	1425.1	1490.6	1556.6	6
7	794.0	855.7	917.7	980.0	1042.6	1105.6	1168.9	1232.6	1296.7	1361.2	1426.2	1491.7	1557.7	7
8	795.0	856.7	918.8	981.1	1043.7	1106.6	1170.0	1233.6	1297.8	1362.3	1427.3	1492.8	1558.8	8
9	796.0	857.8	919.8	982.1	1044.7	1107.7	1171.0	1234.7	1298.8	1363.4	1428.4	1493.9	1559.9	9
10	797.0	858.8	920.8	983.2	1045.8	1108.7	1172.1	1235.8	1299.9	1364.5	1429.5	1495.0	1561.0	10
11	798.1	859.8	921.9	984.2	1046.8	1109.8	1173.1	1236.8	1301.0	1365.6	1430.6	1496.1	1562.1	11
12	799.1	860.9	922.9	985.2	1047.9	1110.8	1174.2	1237.9	1302.0	1366.6	1431.7	1497.2	1563.2	12
13	800.2	861.9	923.9	986.3	1048.9	1111.9	1175.2	1239.0	1303.1	1367.7	1432.8	1498.3	1564.3	13
14	801.2	862.9	925.0	987.3	1049.9	1112.9	1176.3	1240.0	1304.2	1368.8	1433.9	1499.4	1565.4	14
15	802.2	864.0	926.0	988.4	1051.0	1114.0	1177.4	1241.1	1305.3	1369.9	1434.9	1500.5	1566.5	15
16	803.2	865.0	927.0	989.4	1052.0	1115.0	1178.4	1242.2	1306.3	1370.9	1436.0	1501.6	1567.6	16
17	804.2	866.0	928.1	990.4	1053.1	1116.1	1179.5	1243.2	1307.4	1372.0	1437.1	1502.7	1568.7	17
18	805.3	867.1	929.1	991.5	1054.1	1117.1	1180.5	1244.3	1308.5	1373.1	1438.2	1503.8	1569.8	18
19	806.3	868.1	930.1	992.5	1055.2	1118.2	1181.6	1245.4	1309.6	1374.2	1439.3	1504.9	1571.0	19
20	807.3	869.1	931.2	993.6	1056.2	1119.2	1182.7	1246.4	1310.6	1375.3	1440.4	1506.0	1572.1	20
21	808.4	870.1	932.2	994.6	1057.3	1120.3	1183.7	1247.5	1311.7	1376.4	1441.5	1507.1	1573.2	21
22	809.4	871.2	933.2	995.6	1058.3	1121.3	1184.8	1248.6	1312.8	1377.4	1442.6	1508.2	1574.3	22
23	810.4	872.2	934.3	996.7	1059.4	1122.4	1185.8	1249.6	1313.8	1378.5	1443.7	1509.3	1575.4	23
24	811.4	873.2	935.3	997.7	1060.4	1123.4	1186.9	1250.7	1314.9	1379.6	1444.8	1510.4	1576.5	24
25	812.5	874.3	936.3	998.8	1061.4	1124.5	1188.0	1251.8	1316.0	1380.7	1445.8	1511.5	1577.6	25
26	813.5	875.3	937.4	999.8	1062.5	1125.5	1189.0	1252.8	1317.1	1381.8	1446.9	1512.6	1578.7	26
27	814.5	876.3	938.4	1000.8	1063.5	1126.6	1190.1	1253.9	1318.1	1382.8	1448.0	1513.7	1579.8	27
28	815.5	877.4	939.4	1001.9	1064.6	1127.6	1191.1	1255.0	1319.2	1383.9	1449.1	1514.8	1580.9	28
29	816.6	878.4	940.5	1002.9	1065.6	1128.7	1192.2	1256.0	1320.3	1385.0	1450.2	1515.9	1582.0	29
30	817.6	879.4	941.5	1004.0	1066.7	1129.7	1193.2	1257.1	1321.4	1386.1	1451.3	1517.0	1583.2	30
31	818.6	880.5	942.5	1005.0	1067.7	1130.8	1194.3	1258.2	1322.5	1387.2	1452.4	1518.1	1584.3	31
32	819.6	881.5	943.6	1006.1	1068.8	1131.8	1195.4	1259.2	1323.5	1388.3	1453.5	1519.2	1585.4	32
33	820.7	882.5	944.6	1007.1	1069.8	1132.9	1196.4	1260.3	1324.6	1389.4	1454.6	1520.3	1586.5	33
34	821.7	883.6	945.6	1008.1	1070.9	1134.0	1197.5	1261.4	1325.7	1390.4	1455.6	1521.4	1587.6	34
35	822.7	884.6	946.7	1009.2	1072.0	1135.1	1198.5	1262.4	1326.7	1391.5	1456.7	1522.5	1588.7	35
36	823.8	885.6	947.7	1010.2	1073.0	1136.1	1199.6	1263.5	1327.8	1392.6	1457.8	1523.6	1589.8	36
37	824.8	886.7	948.7	1011.3	1074.1	1137.2	1200.7	1264.6	1328.9	1393.7	1458.9	1524.7	1590.9	37
38	825.8	887.7	949.8	1012.3	1075.1	1138.2	1201.7	1265.6	1330.0	1394.8	1460.0	1525.8	1592.0	38
39	826.8	888.7	950.8	1013.4	1076.2	1139.3	1202.8	1266.7	1331.0	1395.8	1461.1	1526.9	1593.2	39
40	827.9	889.8	951.9	1014.4	1077.2	1140.3	1203.9	1267.8	1332.1	1396.9	1462.2	1528.0	1594.3	40
41	828.9	890.8	952.9	1015.4	1078.3	1141.4	1204.9	1268.8	1333.2	1398.0	1463.3	1529.1	1595.4	41
42	829.9	891.8	953.9	1016.5	1079.3	1142.4	1206.0	1269.9	1334.3	1399.1	1464.4	1530.2	1596.5	42
43	831.0	892.9	955.0	1017.5	1080.4	1143.5	1207.1	1271.0	1335.3	1400.2	1465.5	1531.3	1597.6	43
44	832.0	893.9	956.0	1018.6	1081.4	1144.6	1208.1	1272.1	1336.4	1401.3	1466.6	1532.4	1598.7	44
45	833.0	894.9	957.1	1019.6	1082.5	1145.6	1209.2	1273.1	1337.5	1402.4	1467.7	1533.5	1599.8	45
46	834.1	896.0	958.1	1020.6	1083.5	1146.7	1210.2	1274.2	1338.6	1403.4	1468.8	1534.6	1600.9	46
47	835.1	897.0	959.2	1021.7	1084.6	1147.7	1211.3	1275.3	1339.7	1404.5	1469.9	1535.7	1602.0	47
48	836.1	898.0	960.2	1022.7	1085.6	1148.8	1212.4	1276.3	1340.7	1405.6	1470.9	1536.8	1603.1	48
49	837.2	899.1	961.3	1023.8	1086.7	1149.8	1213.4	1277.4	1341.8	1406.7	1472.0	1537.9	1604.3	49
50	838.2	900.1	962.3	1024.8	1087.7	1150.9	1214.5	1278.5	1342.9	1407.8	1473.1	1539.0	1605.4	50
51	839.2	901.1	963.4	1025.9	1088.8	1152.0	1215.5	1279.5	1344.0	1408.8	1474.2	1540.1	1606.5	51
52	840.2	902.2	964.4	1026.9	1089.8	1153.0	1216.6	1280.6	1345.1	1409.9	1475.3	1541.2	1607.6	52
53	841.3	903.2	965.5	1028.0	1090.9	1154.1	1217.7	1281.7	1346.1	1411.0	1476.4	1542.3	1608.7	53
54	842.3	904.3	966.5	1029.0	1091.9	1155.1	1218.7	1282.8	1347.2	1412.1	1477.5	1543.4	1609.8	54
55	843.4	905.3	967.6	1030.1	1093.0	1156.2	1219.8	1283.8	1348.3	1413.2	1478.6	1544.5	1610.9	55
56	844.4	906.3	968.6	1031.1	1094.0	1157.2	1220.9	1284.9	1349.4	1414.3	1479.7	1545.6	1612.0	56
57	845.4	907.4	969.6	1032.2	1095.1	1158.3	1221.9	1286.0	1350.4	1415.4	1480.8	1546.7	1613.1	57
58	846.5	908.4	970.7	1033.2	1096.1	1159.4	1223.0	1287.0	1351.5	1416.5	1481.9	1547.8	1614.2	58
59	847.5	909.4	971.7	1034.3	1097.2	1160.4	1224.1	1288.1	1352.6	1417.6	1483.0	1548.9	1615.4	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	13	14	15	16	17	18	19	20	21	22	23	24	25	D. l.

MERIDIONAL PARTS.

D. l.	26	27	28	29	30	31	32	33	34	35	36	37	38	D. l.
min.	M. P.	min.												
0	1616.5	1683.5	1751.2	1819.5	1888.4	1958.0	2028.4	2099.6	2171.5	2244.3	2318.0	2392.7	2468.3	0
1	1617.6	1684.6	1752.3	1820.6	1889.5	1959.2	2029.6	2100.7	2172.7	2245.5	2319.3	2393.9	2469.6	1
2	1618.7	1685.8	1753.4	1821.7	1890.7	1960.4	2030.7	2101.9	2173.9	2246.8	2320.5	2395.2	2470.8	2
3	1619.8	1686.9	1754.6	1822.9	1891.9	1961.6	2031.9	2103.1	2175.1	2248.0	2321.7	2396.4	2472.1	3
4	1620.9	1688.0	1755.7	1824.0	1893.0	1962.7	2033.1	2104.3	2176.3	2249.2	2323.0	2397.7	2473.4	4
5	1622.0	1689.1	1756.8	1825.2	1894.1	1963.9	2034.3	2105.5	2177.5	2250.4	2324.2	2398.9	2474.6	5
6	1623.2	1690.3	1758.0	1826.3	1895.3	1965.0	2035.5	2106.7	2178.7	2251.6	2325.4	2400.2	2475.9	6
7	1624.3	1691.4	1759.1	1827.5	1896.5	1966.2	2036.7	2107.9	2180.0	2252.9	2326.7	2401.4	2477.1	7
8	1625.4	1692.5	1760.2	1828.6	1897.6	1967.4	2037.8	2109.1	2181.2	2254.1	2327.9	2402.7	2478.5	8
9	1626.5	1693.6	1761.4	1829.7	1898.8	1968.5	2039.0	2110.3	2182.4	2255.3	2329.2	2403.9	2479.7	9
10	1627.6	1694.8	1762.5	1830.9	1899.9	1969.7	2040.2	2111.5	2183.6	2256.5	2330.4	2405.2	2481.0	10
11	1628.7	1695.9	1763.6	1832.0	1901.1	1970.9	2041.4	2112.7	2184.8	2257.8	2331.6	2406.4	2482.3	11
12	1629.8	1697.0	1764.8	1833.2	1902.3	1972.0	2042.6	2113.9	2186.0	2259.0	2332.9	2407.7	2483.5	12
13	1631.0	1698.1	1765.9	1834.3	1903.4	1973.2	2043.8	2115.1	2187.2	2260.2	2334.1	2409.0	2484.8	13
14	1632.1	1699.3	1767.0	1835.5	1904.6	1974.4	2044.9	2116.3	2188.4	2261.4	2335.3	2410.2	2486.1	14
15	1633.2	1700.4	1768.2	1836.6	1905.7	1975.6	2046.1	2117.5	2189.6	2262.7	2336.6	2411.5	2487.4	15
16	1634.3	1701.5	1769.3	1837.8	1906.9	1976.8	2047.3	2118.7	2190.8	2263.9	2337.8	2412.7	2488.6	16
17	1635.4	1702.6	1770.5	1838.9	1908.1	1977.9	2048.5	2119.8	2192.0	2265.1	2339.0	2414.0	2489.9	17
18	1636.5	1703.8	1771.6	1840.1	1909.2	1979.1	2049.7	2121.0	2193.3	2266.3	2340.3	2415.2	2491.2	18
19	1637.7	1704.9	1772.7	1841.2	1910.4	1980.3	2050.8	2122.2	2194.5	2267.6	2341.5	2416.5	2492.5	19
20	1638.8	1706.0	1773.9	1842.4	1911.5	1981.4	2052.0	2123.4	2195.7	2268.8	2342.8	2417.8	2493.7	20
21	1639.9	1707.1	1775.0	1843.5	1912.7	1982.6	2053.2	2124.6	2196.9	2270.0	2344.0	2419.0	2495.0	21
22	1641.0	1708.3	1776.1	1844.6	1913.8	1983.7	2054.4	2125.8	2198.1	2271.2	2345.3	2420.3	2496.3	22
23	1642.1	1709.4	1777.2	1845.8	1915.0	1984.9	2055.6	2127.0	2199.3	2272.5	2346.5	2421.5	2497.6	23
24	1643.2	1710.5	1778.4	1846.9	1916.2	1986.1	2056.8	2128.2	2200.5	2273.7	2347.8	2422.8	2498.8	24
25	1644.3	1711.6	1779.5	1848.1	1917.3	1987.3	2058.0	2129.4	2201.7	2274.9	2349.0	2424.0	2500.1	25
26	1645.5	1712.8	1780.6	1849.2	1918.5	1988.4	2059.1	2130.6	2203.0	2276.1	2350.2	2425.3	2501.4	26
27	1646.6	1713.9	1781.8	1850.4	1919.6	1989.6	2060.3	2131.8	2204.2	2277.4	2351.5	2426.5	2502.7	27
28	1647.7	1715.0	1783.0	1851.5	1920.8	1990.8	2061.5	2133.0	2205.4	2278.6	2352.7	2427.8	2503.9	28
29	1648.8	1716.1	1784.1	1852.7	1921.9	1992.0	2062.7	2134.2	2206.6	2279.8	2354.0	2429.1	2505.2	29
30	1649.9	1717.3	1785.2	1853.8	1923.1	1993.1	2063.9	2135.4	2207.8	2281.0	2355.2	2430.3	2506.5	30
31	1651.0	1718.4	1786.4	1855.0	1924.3	1994.3	2065.1	2136.6	2209.0	2282.3	2356.5	2431.6	2507.8	31
32	1652.2	1719.5	1787.5	1856.1	1925.4	1995.5	2066.2	2137.8	2210.2	2283.5	2357.7	2432.9	2509.0	32
33	1653.3	1720.7	1788.6	1857.2	1926.6	1996.6	2067.4	2139.0	2211.4	2284.7	2358.9	2434.1	2510.3	33
34	1654.4	1721.8	1789.8	1858.4	1927.8	1997.8	2068.6	2140.2	2212.7	2286.0	2360.2	2435.4	2511.6	34
35	1655.5	1722.9	1790.9	1859.6	1928.9	1999.0	2069.8	2141.4	2213.9	2287.2	2361.4	2436.7	2512.9	35
36	1656.6	1724.0	1792.1	1860.7	1930.1	2000.2	2071.0	2142.6	2215.1	2288.4	2362.7	2437.9	2514.2	36
37	1657.8	1725.2	1793.2	1861.9	1931.3	2001.3	2072.2	2143.8	2216.3	2289.7	2363.9	2439.2	2515.4	37
38	1658.9	1726.3	1794.3	1863.0	1932.4	2002.5	2073.4	2145.0	2217.5	2290.9	2365.2	2440.4	2516.7	38
39	1660.0	1727.4	1795.5	1864.2	1933.6	2003.7	2074.6	2146.2	2218.7	2292.1	2366.4	2441.7	2518.0	39
40	1661.1	1728.6	1796.6	1865.3	1934.7	2004.9	2075.7	2147.4	2219.9	2293.3	2367.7	2443.0	2519.3	40
41	1662.2	1729.7	1797.8	1866.5	1935.9	2006.0	2076.9	2148.6	2221.2	2294.6	2368.9	2444.2	2520.6	41
42	1663.4	1730.8	1798.9	1867.6	1937.1	2007.2	2078.1	2149.8	2222.4	2295.8	2370.2	2445.5	2521.8	42
43	1664.5	1731.9	1800.0	1868.8	1938.2	2008.4	2079.3	2151.0	2223.6	2297.0	2371.4	2446.8	2523.1	43
44	1665.6	1733.1	1801.2	1869.9	1939.4	2009.6	2080.5	2152.2	2224.8	2298.3	2372.7	2448.0	2524.4	44
45	1666.7	1734.2	1802.3	1871.1	1940.5	2010.7	2081.7	2153.4	2226.0	2299.5	2373.9	2449.3	2525.7	45
46	1667.8	1735.3	1803.5	1872.2	1941.7	2011.9	2082.9	2154.6	2227.2	2300.7	2375.2	2450.6	2527.0	46
47	1669.0	1736.5	1804.6	1873.4	1942.9	2013.1	2084.1	2155.8	2228.5	2302.0	2376.4	2451.8	2528.3	47
48	1670.1	1737.6	1805.7	1874.5	1944.0	2014.3	2085.3	2157.0	2229.7	2303.2	2377.7	2453.1	2529.5	48
49	1671.2	1738.7	1806.9	1875.7	1945.2	2015.4	2086.5	2158.2	2230.9	2304.4	2378.9	2454.3	2530.8	49
50	1672.3	1739.9	1808.0	1876.8	1946.4	2016.6	2087.7	2159.4	2232.1	2305.7	2380.1	2455.6	2532.1	50
51	1673.4	1741.0	1809.2	1878.0	1947.5	2017.8	2088.9	2160.7	2233.3	2306.9	2381.4	2456.9	2533.4	51
52	1674.5	1742.1	1810.3	1879.2	1948.7	2019.0	2090.1	2161.9	2234.6	2308.1	2382.6	2458.1	2534.7	52
53	1675.7	1743.2	1811.4	1880.3	1949.9	2020.2	2091.3	2163.1	2235.8	2309.4	2383.9	2459.4	2536.0	53
54	1676.8	1744.4	1812.6	1881.5	1951.0	2021.3	2092.5	2164.3	2237.0	2310.6	2385.1	2460.7	2537.2	54
55	1678.0	1745.5	1813.7	1882.6	1952.2	2022.5	2093.7	2165.5	2238.2	2311.8	2386.4	2461.9	2538.5	55
56	1679.1	1746.6	1814.9	1883.8	1953.4	2023.7	2094.9	2166.7	2239.4	2313.1	2387.6	2463.2	2539.8	56
57	1680.2	1747.8	1816.0	1884.9	1954.5	2024.9	2096.1	2167.9	2240.7	2314.3	2388.9	2464.5	2541.1	57
58	1681.3	1748.9	1817.2	1886.1	1955.7	2026.0	2097.3	2169.1	2241.9	2315.5	2390.2	2465.8	2542.4	58
59	1682.4	1750.0	1818.3	1887.2	1956.9	2027.2	2098.5	2170.3	2243.1	2316.7	2391.4	2467.0	2543.7	59
min.	M. P.	min.												
D. l.	26	27	28	29	30	31	32	33	34	35	36	37	38	D. l.

MERIDIONAL PARTS.

D. l.	39	40	41	42	43	44	45	46	47	48	49	50	51	D. l.
min.	M. P.	min.												
0	2545.0	2622.7	2701.6	2781.7	2863.1	2945.7	3030.0	3115.6	3202.8	3291.6	3382.1	3474.5	3568.8	0
1	2546.2	2624.0	2702.9	2783.1	2864.5	2947.2	3031.4	3117.0	3204.2	3293.1	3383.6	3476.1	3570.4	1
2	2547.5	2625.3	2704.3	2784.4	2865.8	2948.6	3032.8	3118.5	3205.7	3294.6	3385.2	3477.6	3572.0	2
3	2548.8	2626.6	2705.6	2785.8	2867.2	2950.0	3034.2	3119.9	3207.2	3296.1	3386.7	3479.2	3573.6	3
4	2550.1	2627.9	2706.9	2787.1	2868.5	2951.4	3035.6	3121.4	3208.6	3297.5	3388.2	3480.7	3575.2	4
5	2551.4	2629.2	2708.3	2788.5	2870.0	2952.8	3037.0	3122.8	3210.1	3299.0	3389.7	3482.3	3576.8	5
6	2552.7	2630.5	2709.6	2789.8	2871.3	2954.2	3038.4	3124.2	3211.6	3300.5	3391.3	3483.9	3578.4	6
7	2554.0	2631.9	2710.9	2791.2	2872.7	2955.6	3039.8	3125.7	3213.0	3302.0	3392.8	3485.4	3580.0	7
8	2555.3	2633.2	2712.2	2792.5	2874.1	2957.0	3041.3	3127.1	3214.5	3303.5	3394.3	3487.0	3581.6	8
9	2556.6	2634.5	2713.6	2793.8	2875.4	2958.4	3042.7	3128.6	3216.0	3305.0	3395.9	3488.5	3583.2	9
10	2557.8	2635.8	2714.9	2795.1	2876.8	2959.8	3044.1	3130.0	3217.4	3306.5	3397.4	3490.1	3584.8	10
11	2559.1	2637.1	2716.2	2796.5	2878.2	2961.1	3045.5	3131.5	3218.9	3308.0	3399.9	3491.7	3586.4	11
12	2560.4	2638.4	2717.5	2797.9	2879.5	2962.5	3047.0	3132.9	3220.4	3309.5	3400.4	3493.2	3588.0	12
13	2561.7	2639.7	2718.9	2799.3	2880.9	2963.9	3048.4	3134.3	3221.9	3311.0	3402.0	3494.8	3589.5	13
14	2563.0	2641.0	2720.2	2800.6	2882.3	2965.3	3049.8	3135.8	3223.3	3312.5	3403.5	3496.3	3591.1	14
15	2564.3	2642.3	2721.5	2802.0	2883.7	2966.7	3051.2	3137.2	3224.8	3314.0	3405.0	3497.9	3592.7	15
16	2565.6	2643.6	2722.9	2803.3	2885.0	2968.1	3052.6	3138.7	3226.3	3315.5	3406.6	3499.5	3594.3	16
17	2566.9	2644.9	2724.2	2804.7	2886.4	2969.5	3054.1	3140.1	3227.7	3317.0	3408.1	3501.0	3595.9	17
18	2568.2	2646.3	2725.5	2806.0	2887.8	2970.9	3055.5	3141.6	3229.2	3318.5	3409.6	3502.6	3597.5	18
19	2569.5	2647.6	2726.9	2807.4	2889.2	2972.3	3056.9	3143.0	3230.7	3320.0	3411.2	3504.2	3599.1	19
20	2570.7	2648.9	2728.2	2808.8	2890.5	2973.7	3058.3	3144.5	3232.2	3321.5	3412.7	3505.7	3600.7	20
21	2572.0	2650.2	2729.5	2810.1	2891.9	2975.1	3059.7	3145.9	3233.6	3323.1	3414.2	3507.3	3602.3	21
22	2573.3	2651.5	2730.8	2811.4	2893.3	2976.5	3061.2	3147.3	3235.1	3324.6	3415.8	3508.9	3603.9	22
23	2574.6	2652.8	2732.2	2812.8	2894.7	2977.9	3062.6	3148.8	3236.6	3326.1	3417.3	3510.5	3605.5	23
24	2575.9	2654.1	2733.5	2814.1	2896.0	2979.3	3064.0	3150.3	3238.1	3327.6	3418.8	3512.0	3607.1	24
25	2577.2	2655.5	2734.8	2815.5	2897.4	2980.7	3065.4	3151.7	3239.5	3329.1	3420.4	3513.6	3608.7	25
26	2578.5	2656.8	2736.2	2816.8	2898.8	2982.1	3066.9	3153.2	3241.0	3330.6	3421.9	3515.1	3610.3	26
27	2579.7	2658.1	2737.5	2818.2	2900.2	2983.5	3068.3	3154.6	3242.5	3332.1	3423.5	3516.7	3611.9	27
28	2581.1	2659.4	2738.8	2819.5	2901.5	2984.9	3069.7	3156.1	3244.0	3333.6	3425.0	3518.3	3613.6	28
29	2582.4	2660.7	2740.2	2820.9	2902.9	2986.3	3071.1	3157.5	3245.5	3335.1	3426.5	3519.8	3615.2	29
30	2583.7	2662.0	2741.5	2822.3	2904.3	2987.7	3072.6	3159.0	3246.9	3336.6	3428.1	3521.4	3616.8	30
31	2585.0	2663.3	2742.9	2823.6	2905.7	2989.1	3074.0	3160.4	3248.4	3338.1	3429.6	3523.0	3618.4	31
32	2586.3	2664.6	2744.2	2825.0	2907.1	2990.5	3075.4	3161.9	3249.9	3339.6	3431.2	3524.6	3620.0	32
33	2587.6	2666.0	2745.5	2826.3	2908.4	2991.9	3076.9	3163.3	3251.4	3341.1	3432.7	3526.1	3621.6	33
34	2588.9	2667.3	2746.9	2827.7	2909.7	2993.3	3078.3	3164.8	3252.9	3342.7	3434.2	3527.7	3623.2	34
35	2590.2	2668.6	2748.2	2829.0	2911.2	2994.7	3079.7	3166.2	3254.4	3344.2	3435.8	3529.3	3624.8	35
36	2591.5	2669.9	2749.5	2830.4	2912.6	2996.1	3081.1	3167.7	3255.8	3345.7	3437.3	3530.9	3626.4	36
37	2592.8	2671.2	2750.9	2831.8	2914.0	2997.5	3082.6	3169.1	3257.3	3347.2	3438.9	3532.4	3628.0	37
38	2594.1	2672.5	2752.2	2833.1	2915.3	2998.9	3084.0	3170.6	3258.8	3348.7	3440.4	3534.0	3629.6	38
39	2595.4	2673.9	2753.5	2834.5	2916.7	3000.3	3085.4	3172.1	3260.3	3350.1	3442.0	3535.6	3631.1	39
40	2596.7	2675.1	2754.9	2835.8	2918.1	3001.8	3086.9	3173.5	3261.8	3351.7	3443.5	3537.2	3632.9	40
41	2598.0	2676.5	2756.2	2837.2	2919.5	3003.2	3088.3	3175.0	3263.3	3353.2	3445.0	3538.8	3634.5	41
42	2599.3	2677.8	2757.6	2838.6	2920.9	3004.6	3089.7	3176.4	3264.7	3354.8	3446.6	3540.3	3636.1	42
43	2600.6	2679.1	2758.9	2839.9	2922.3	3006.0	3091.2	3177.9	3266.2	3356.3	3448.1	3541.9	3637.7	43
44	2601.9	2680.5	2760.2	2841.3	2923.6	3007.4	3092.6	3179.3	3267.7	3357.8	3449.7	3543.5	3639.3	44
45	2603.2	2681.8	2761.5	2842.6	2925.0	3008.8	3094.0	3180.8	3269.2	3359.3	3451.2	3545.1	3640.9	45
46	2604.5	2683.1	2762.9	2844.0	2926.4	3010.2	3095.5	3182.3	3270.7	3360.8	3452.8	3546.7	3642.5	46
47	2605.8	2684.4	2764.3	2845.4	2927.8	3011.6	3096.9	3183.7	3272.2	3362.3	3454.3	3548.2	3644.2	47
48	2607.1	2685.7	2765.6	2846.7	2929.2	3013.0	3098.3	3185.2	3273.7	3363.9	3455.9	3549.8	3645.8	48
49	2608.4	2687.1	2766.9	2848.1	2930.6	3014.4	3099.8	3186.6	3275.2	3365.4	3457.4	3551.4	3647.4	49
50	2609.7	2688.4	2768.3	2849.5	2932.0	3015.8	3101.2	3188.1	3276.6	3366.9	3459.0	3553.0	3649.0	50
51	2611.0	2689.7	2769.6	2850.8	2933.3	3017.2	3102.6	3189.6	3278.1	3368.4	3460.5	3554.6	3650.6	51
52	2612.3	2691.0	2771.0	2852.2	2934.7	3018.7	3104.1	3191.0	3279.6	3369.9	3462.1	3556.1	3652.3	52
53	2613.6	2692.3	2772.3	2853.6	2936.1	3020.1	3105.6	3192.5	3281.1	3371.5	3463.6	3557.7	3653.9	53
54	2614.9	2693.7	2773.7	2854.9	2937.5	3021.5	3107.0	3194.0	3282.6	3373.0	3465.2	3559.3	3655.5	54
55	2616.2	2695.0	2775.0	2856.3	2938.9	3022.9	3108.4	3195.4	3284.1	3374.5	3466.7	3560.9	3657.1	55
56	2617.5	2696.3	2776.4	2857.7	2940.3	3024.3	3109.8	3196.9	3285.6	3376.0	3468.3	3562.5	3658.7	56
57	2618.8	2697.6	2777.7	2859.1	2941.7	3025.7	3111.2	3198.4	3287.1	3377.6	3469.8	3564.1	3660.4	57
58	2620.1	2699.0	2779.0	2860.5	2943.1	3027.1	3112.7	3199.8	3288.6	3379.1	3471.4	3565.7	3662.0	58
59	2621.4	2700.3	2780.4	2861.8	2944.4	3028.5	3114.1	3201.3	3290.1	3380.6	3473.0	3567.3	3663.6	59
min.	M. P.	min.												
D. l.	39	40	41	42	43	44	45	46	47	48	49	50	51	D. l.

MERIDIONAL PARTS.

D. I.	52	53	54	55	56	57	58	59	60	61	62	63	64	D. I.
min.	M. P.	min.												
0	3665.2	3763.8	3864.7	3968.0	4073.9	4182.6	4294.3	4409.2	4527.4	4649.2	4775.0	4905.0	5039.4	0
1	3666.9	3765.5	3866.4	3969.7	4075.7	4184.5	4296.2	4411.1	4529.4	4651.3	4777.1	4907.2	5041.7	1
2	3668.5	3767.1	3868.1	3971.5	4077.5	4186.3	4298.1	4413.1	4531.4	4653.4	4779.3	4909.4	5044.0	2
3	3670.1	3768.8	3869.8	3973.2	4079.3	4188.2	4300.0	4415.0	4533.4	4655.5	4781.4	4911.6	5046.3	3
4	3671.7	3770.4	3871.5	3975.0	4081.1	4190.0	4301.9	4417.0	4535.4	4657.5	4783.5	4913.8	5048.6	4
5	3673.4	3772.1	3873.2	3976.7	4082.9	4191.8	4303.8	4418.9	4537.4	4659.6	4785.7	4916.0	5050.8	5
6	3675.0	3773.8	3874.9	3978.4	4084.7	4193.7	4305.7	4420.8	4539.4	4661.7	4787.8	4918.2	5053.2	6
7	3676.6	3775.4	3876.6	3980.2	4086.5	4195.5	4307.6	4422.4	4541.4	4663.7	4790.0	4920.4	5055.5	7
8	3678.2	3777.1	3878.3	3982.0	4088.3	4197.4	4309.5	4424.7	4543.4	4665.8	4792.1	4922.6	5057.7	8
9	3679.9	3778.8	3880.0	3983.7	4090.1	4199.2	4311.4	4426.7	4545.4	4667.9	4794.2	4924.8	5060.0	9
10	3681.5	3780.4	3881.7	3985.5	4091.9	4201.1	4313.2	4428.6	4547.5	4669.9	4796.4	4927.1	5062.3	10
11	3683.1	3782.1	3883.4	3987.2	4093.7	4202.9	4315.1	4430.6	4549.5	4672.0	4798.5	4929.3	5064.6	11
12	3684.8	3783.8	3885.1	3989.0	4095.5	4204.7	4317.0	4432.5	4551.5	4674.1	4800.7	4931.5	5066.9	12
13	3686.4	3785.5	3886.8	3990.7	4097.3	4206.6	4318.9	4434.5	4553.5	4676.2	4802.8	4933.7	5069.2	13
14	3688.0	3787.1	3888.6	3992.5	4099.1	4208.4	4320.8	4436.4	4555.5	4678.2	4804.9	4935.9	5071.5	14
15	3689.7	3788.8	3890.3	3994.2	4100.9	4210.3	4322.7	4438.4	4557.5	4680.3	4807.1	4938.1	5073.8	15
16	3691.3	3790.5	3892.0	3996.0	4102.7	4212.1	4324.6	4440.4	4559.5	4682.4	4809.2	4940.4	5076.1	16
17	3692.9	3792.1	3893.7	3997.7	4104.5	4214.0	4326.5	4442.3	4561.5	4684.5	4811.4	4942.6	5078.4	17
18	3694.6	3793.8	3895.4	3999.5	4106.3	4215.8	4328.4	4444.3	4563.5	4686.6	4813.5	4944.8	5080.7	18
19	3696.2	3795.5	3897.1	4001.3	4108.1	4217.7	4330.3	4446.2	4565.6	4688.6	4815.7	4947.0	5083.0	19
20	3697.8	3797.2	3898.8	4003.0	4109.9	4219.5	4332.2	4448.2	4567.6	4690.7	4817.8	4949.3	5085.3	20
21	3699.5	3798.8	3900.5	4004.8	4111.7	4221.4	4334.2	4450.2	4569.6	4692.8	4820.0	4951.5	5087.7	21
22	3701.1	3800.5	3902.3	4006.5	4113.5	4223.2	4336.1	4452.1	4571.6	4694.9	4822.2	4953.7	5090.0	22
23	3702.7	3802.2	3904.0	4008.3	4115.3	4225.1	4338.0	4454.1	4573.7	4697.0	4824.3	4956.0	5092.3	23
24	3704.4	3803.9	3905.7	4010.0	4117.1	4227.0	4339.9	4456.0	4575.7	4699.1	4826.5	4958.2	5094.6	24
25	3706.0	3805.5	3907.4	4011.8	4118.9	4228.8	4341.8	4458.0	4577.7	4701.2	4828.6	4960.4	5096.9	25
26	3707.7	3807.2	3909.1	4013.6	4120.7	4230.7	4343.7	4460.0	4579.7	4703.2	4830.8	4962.7	5099.2	26
27	3709.3	3808.9	3910.9	4015.3	4122.5	4232.5	4345.6	4461.9	4581.8	4705.3	4832.9	4964.9	5101.5	27
28	3710.9	3810.6	3912.6	4017.1	4124.3	4234.4	4347.5	4463.9	4583.8	4707.4	4835.1	4967.1	5103.9	28
29	3712.6	3812.3	3914.3	4018.9	4126.1	4236.2	4349.4	4465.9	4585.8	4709.5	4837.3	4969.4	5106.2	29
30	3714.2	3813.9	3916.0	4020.6	4127.9	4238.1	4351.3	4467.8	4587.8	4711.6	4839.4	4971.6	5108.5	30
31	3715.9	3815.6	3917.7	4022.4	4129.7	4240.0	4353.3	4469.8	4589.9	4713.7	4841.6	4973.9	5110.8	31
32	3717.5	3817.3	3919.5	4024.2	4131.6	4241.8	4355.2	4471.8	4591.9	4715.8	4843.8	4976.1	5113.1	32
33	3719.2	3819.0	3921.2	4025.9	4133.4	4243.7	4357.1	4473.8	4593.9	4717.9	4845.9	4978.3	5115.5	33
34	3720.8	3820.7	3922.9	4027.7	4135.2	4245.6	4359.0	4475.7	4596.0	4720.0	4848.1	4980.6	5117.8	34
35	3722.4	3822.3	3924.6	4029.5	4137.0	4247.4	4360.9	4477.7	4598.0	4722.1	4850.3	4982.8	5120.1	35
36	3724.1	3824.0	3926.4	4031.2	4138.8	4249.3	4362.8	4479.7	4600.1	4724.2	4852.5	4985.1	5122.5	36
37	3725.7	3825.7	3928.1	4033.0	4140.6	4251.2	4364.8	4481.7	4602.1	4726.3	4854.6	4987.3	5124.8	37
38	3727.4	3827.4	3929.8	4034.8	4142.5	4253.0	4366.7	4483.6	4604.1	4728.4	4856.8	4989.6	5127.1	38
39	3729.0	3829.1	3931.5	4036.6	4144.3	4254.9	4368.6	4485.6	4606.2	4730.5	4859.0	4991.8	5129.5	39
40	3730.7	3830.8	3933.3	4038.3	4146.1	4256.8	4370.5	4487.6	4608.2	4732.6	4861.2	4994.1	5131.8	40
41	3732.3	3832.5	3935.0	4040.1	4147.9	4258.6	4372.5	4489.6	4610.3	4734.7	4863.3	4996.3	5134.1	41
42	3734.0	3834.2	3936.7	4041.9	4149.7	4260.5	4374.4	4491.6	4612.3	4736.9	4865.5	4998.6	5136.5	42
43	3735.6	3835.8	3938.5	4043.6	4151.6	4262.4	4376.3	4493.5	4614.3	4739.0	4867.7	5000.9	5138.8	43
44	3737.3	3837.5	3940.2	4045.4	4153.4	4264.3	4378.2	4495.5	4616.4	4741.1	4869.9	5003.1	5141.2	44
45	3738.9	3839.2	3941.9	4047.2	4155.2	4266.1	4380.1	4497.5	4618.4	4743.2	4872.1	5005.4	5143.5	45
46	3740.6	3840.9	3943.7	4049.0	4157.0	4268.0	4382.1	4499.5	4620.5	4745.3	4874.3	5007.6	5145.9	46
47	3742.2	3842.6	3945.4	4050.8	4158.8	4269.9	4384.0	4501.5	4622.5	4747.4	4876.4	5009.9	5148.2	47
48	3743.9	3844.3	3947.1	4052.5	4160.7	4271.8	4385.9	4503.5	4624.6	4749.5	4878.6	5012.2	5150.6	48
49	3745.6	3846.0	3948.9	4054.3	4162.5	4273.6	4387.9	4505.5	4626.6	4751.7	4880.8	5014.4	5152.9	49
50	3747.2	3847.7	3950.6	4056.1	4164.3	4275.5	4389.8	4507.5	4628.7	4753.8	4882.0	5016.7	5155.3	50
51	3748.9	3849.4	3952.3	4057.9	4166.2	4277.4	4391.7	4509.4	4630.7	4755.9	4885.2	5019.0	5157.6	51
52	3750.5	3851.1	3954.1	4059.7	4168.0	4279.3	4393.7	4511.4	4632.8	4758.0	4887.4	5021.2	5160.0	52
53	3752.2	3852.8	3955.8	4061.4	4169.8	4281.1	4395.6	4513.4	4634.8	4760.1	4889.6	5023.5	5162.3	53
54	3753.8	3854.5	3957.6	4063.2	4171.7	4283.0	4397.5	4515.4	4636.9	4762.3	4891.8	5025.8	5164.7	54
55	3755.5	3856.2	3959.3	4065.0	4173.5	4284.9	4399.5	4517.4	4639.0	4764.4	4894.0	5028.1	5167.0	55
56	3757.2	3857.9	3961.0	4066.8	4175.3	4286.8	4401.4	4519.4	4641.0	4766.5	4896.2	5030.3	5169.4	56
57	3758.8	3859.6	3962.8	4068.6	4177.2	4288.7	4403.4	4521.4	4643.1	4768.6	4898.4	5032.6	5171.8	57
58	3760.5	3861.3	3964.5	4070.4	4179.0	4290.6	4405.3	4523.4	4645.1	4770.8	4900.6	5034.9	5174.1	58
59	3762.2	3863.0	3966.3	4072.1	4180.8	4292.5	4407.2	4525.4	4647.2	4772.9	4902.8	5037.2	5176.5	59
min.	M. P.	min.												
D. I.	52	53	54	55	56	57	58	59	60	61	62	63	64	D. I.

MERIDIONAL PARTS.

D. I.	65	66	67	68	69	70	71	72	73	74	75	76	77	D. I.
min.	M. P.	min.												
0	5178.8	5323.6	5474.0	5630.9	5794.6	5966.0	6145.7	6334.9	6534.5	6745.7	6970.3	7210.1	7467.2	0
1	5181.2	5326.0	5476.6	5633.5	5797.4	5968.9	6148.8	6338.1	6537.9	6749.4	6974.2	7214.2	7471.7	1
2	5183.6	5328.5	5479.2	5636.2	5800.2	5971.8	6151.9	6341.4	6541.3	6753.0	6978.1	7218.3	7476.1	2
3	5186.0	5330.9	5481.7	5638.9	5803.0	5974.7	6155.0	6344.6	6544.7	6756.6	6981.9	7222.5	7480.6	3
4	5188.3	5333.4	5484.3	5641.5	5805.8	5977.7	6158.0	6347.8	6548.2	6760.3	6985.8	7226.6	7485.0	4
5	5190.7	5335.9	5486.9	5644.2	5808.6	5980.6	6161.1	6351.1	6551.6	6763.9	6989.7	7230.8	7489.5	5
6	5193.1	5338.3	5489.4	5646.9	5811.4	5983.5	6164.2	6354.3	6555.0	6767.6	6993.6	7234.9	7494.0	6
7	5195.4	5340.8	5492.0	5649.6	5814.2	5986.5	6167.3	6357.6	6558.5	6771.2	6997.5	7239.1	7498.5	7
8	5197.8	5343.3	5494.6	5652.3	5817.0	5989.4	6170.4	6360.9	6561.9	6774.9	7001.4	7243.3	7502.9	8
9	5200.2	5345.7	5497.1	5655.0	5819.8	5992.4	6173.5	6364.1	6565.4	6778.5	7005.3	7247.5	7507.4	9
10	5202.6	5348.2	5499.7	5657.6	5822.6	5995.3	6176.6	6367.4	6568.8	6782.2	7009.2	7251.6	7511.9	10
11	5205.0	5350.7	5502.3	5660.3	5825.4	5998.3	6179.7	6370.6	6572.3	6785.8	7013.1	7255.8	7516.4	11
12	5207.3	5353.2	5504.9	5663.0	5828.2	6001.2	6182.8	6373.9	6575.7	6789.5	7017.0	7260.0	7520.9	12
13	5209.7	5355.6	5507.4	5665.7	5831.0	6004.2	6185.9	6377.2	6579.2	6793.2	7020.9	7264.2	7525.4	13
14	5212.1	5358.1	5510.0	5668.4	5833.9	6007.1	6189.0	6380.5	6582.6	6796.9	7024.8	7268.4	7530.0	14
15	5214.5	5360.6	5512.6	5671.1	5836.7	6010.1	6192.1	6383.7	6586.1	6800.5	7028.7	7272.6	7534.5	15
16	5216.9	5363.1	5515.2	5673.8	5839.5	6013.0	6195.2	6387.0	6589.5	6804.2	7032.7	7276.8	7539.0	16
17	5219.3	5365.6	5517.8	5676.5	5842.3	6016.0	6198.3	6390.3	6593.0	6807.9	7036.6	7281.0	7543.6	17
18	5221.7	5368.1	5520.4	5679.2	5845.2	6019.0	6201.4	6393.6	6596.5	6811.6	7040.5	7285.2	7548.1	18
19	5224.1	5370.5	5523.0	5681.9	5848.0	6021.9	6204.6	6396.9	6599.9	6815.3	7044.5	7289.4	7552.7	19
20	5226.5	5373.0	5525.6	5684.6	5850.8	6024.9	6207.7	6400.2	6603.4	6819.0	7048.4	7293.7	7557.2	20
21	5228.9	5375.5	5528.2	5687.3	5853.7	6027.9	6210.8	6403.5	6606.9	6822.7	7052.4	7297.9	7561.8	21
22	5231.3	5378.0	5530.8	5690.0	5856.5	6030.8	6213.9	6406.8	6610.4	6826.4	7056.3	7302.1	7566.3	22
23	5233.7	5380.5	5533.4	5692.8	5859.3	6033.8	6217.1	6410.1	6613.9	6830.1	7060.3	7306.4	7570.9	23
24	5236.1	5383.0	5536.0	5695.5	5862.2	6036.8	6220.2	6413.4	6617.4	6833.8	7064.2	7310.6	7575.5	24
25	5238.5	5385.5	5538.6	5698.2	5865.0	6039.8	6223.3	6416.7	6620.9	6837.6	7068.2	7314.9	7580.1	25
26	5240.9	5388.0	5541.2	5700.9	5867.9	6042.7	6226.5	6420.0	6624.4	6841.3	7072.2	7319.1	7584.7	26
27	5243.3	5390.5	5543.8	5703.6	5870.7	6045.7	6229.6	6423.3	6627.9	6845.0	7076.2	7323.4	7589.3	27
28	5245.7	5393.0	5546.4	5706.3	5873.5	6048.7	6232.7	6426.6	6631.4	6848.7	7080.1	7327.7	7593.9	28
29	5248.1	5395.5	5549.0	5709.1	5876.4	6051.7	6235.9	6429.9	6635.0	6852.5	7084.1	7332.0	7598.5	29
30	5250.5	5398.0	5551.6	5711.8	5879.3	6054.7	6239.0	6433.2	6638.5	6856.2	7088.1	7336.2	7603.1	30
31	5252.9	5400.5	5554.2	5714.5	5882.1	6057.7	6242.2	6436.6	6642.0	6860.0	7092.1	7340.4	7607.7	31
32	5255.3	5403.0	5556.8	5717.3	5885.0	6060.7	6245.3	6439.9	6645.5	6863.7	7096.1	7344.8	7612.3	32
33	5257.7	5405.6	5559.5	5720.0	5887.8	6063.7	6248.5	6443.2	6649.1	6867.5	7100.1	7349.1	7617.0	33
34	5260.1	5408.1	5562.1	5722.7	5890.7	6066.7	6251.7	6446.6	6652.6	6871.2	7104.1	7353.4	7621.6	34
35	5262.6	5410.6	5564.7	5725.5	5893.6	6069.7	6254.8	6449.9	6656.1	6875.0	7108.2	7357.7	7626.3	35
36	5265.0	5413.1	5567.3	5728.2	5896.4	6072.7	6258.0	6453.3	6659.7	6878.7	7112.2	7362.0	7630.9	36
37	5267.4	5415.6	5569.9	5731.0	5899.3	6075.7	6261.2	6456.6	6663.2	6882.5	7116.2	7366.4	7635.6	37
38	5269.8	5418.1	5572.6	5733.7	5902.2	6078.8	6264.4	6460.0	6666.8	6886.3	7120.2	7370.7	7640.2	38
39	5272.3	5420.7	5575.2	5736.4	5905.1	6081.8	6267.5	6463.3	6670.3	6890.1	7124.3	7375.0	7644.9	39
40	5274.7	5423.2	5577.8	5739.2	5907.9	6084.8	6270.7	6466.7	6673.9	6893.8	7128.3	7379.4	7649.6	40
41	5277.1	5425.7	5580.5	5741.9	5910.8	6087.8	6273.9	6470.0	6677.4	6897.6	7132.3	7383.7	7654.3	41
42	5279.5	5428.2	5583.1	5744.7	5913.7	6090.8	6277.1	6473.4	6681.0	6901.4	7136.4	7388.0	7659.0	42
43	5282.0	5430.8	5585.7	5747.5	5916.6	6093.9	6280.3	6476.8	6684.6	6905.2	7140.4	7392.4	7663.7	43
44	5284.4	5433.3	5588.4	5750.2	5919.5	6096.9	6283.5	6480.1	6688.1	6909.0	7144.5	7396.8	7668.4	44
45	5286.8	5435.8	5591.0	5753.0	5922.4	6099.9	6286.6	6483.5	6691.7	6912.8	7148.6	7401.1	7673.1	45
46	5289.3	5438.4	5593.7	5755.7	5925.2	6103.0	6289.8	6486.9	6695.3	6916.6	7152.6	7405.5	7677.8	46
47	5291.7	5440.9	5596.3	5758.5	5928.1	6106.0	6293.0	6490.3	6698.9	6920.4	7156.7	7409.9	7682.6	47
48	5294.2	5443.5	5599.0	5761.3	5931.0	6109.1	6296.2	6493.6	6702.4	6924.2	7160.8	7414.2	7687.3	48
49	5296.6	5446.0	5601.6	5764.0	5933.9	6112.1	6299.4	6497.0	6706.0	6928.1	7164.9	7418.6	7692.0	49
50	5299.0	5448.5	5604.3	5766.8	5936.8	6115.1	6302.7	6500.4	6709.6	6931.9	7169.0	7423.0	7696.8	50
51	5301.5	5451.1	5606.9	5769.6	5939.7	6118.2	6305.9	6503.8	6713.2	6935.7	7173.0	7427.4	7701.5	51
52	5303.9	5453.6	5609.6	5772.3	5942.6	6121.2	6309.1	6507.2	6716.8	6939.5	7177.1	7431.8	7706.3	52
53	5306.3	5456.2	5612.2	5775.1	5945.5	6124.3	6312.3	6510.6	6720.4	6943.4	7181.2	7436.2	7711.0	53
54	5308.8	5458.7	5614.9	5777.9	5948.5	6127.4	6315.5	6514.0	6724.0	6947.2	7185.3	7440.6	7715.8	54
55	5311.3	5461.3	5617.5	5780.7	5951.4	6130.4	6318.7	6517.4	6727.6	6951.1	7189.5	7445.0	7720.6	55
56	5313.7	5463.8	5620.2	5783.5	5954.3	6133.5	6322.0	6520.8	6731.2	6954.9	7193.6	7449.5	7725.4	56
57	5316.2	5466.4	5622.9	5786.2	5957.2	6136.5	6325.2	6524.2	6734.9	6958.8	7197.7	7453.9	7730.2	57
58	5318.6	5468.9	5625.5	5789.0	5960.1	6139.6	6328.4	6527.6	6738.5	6962.6	7201.8	7458.3	7735.0	58
59	5321.1	5471.5	5628.2	5791.8	5963.0	6142.7	6331.7	6531.0	6742.1	6966.5	7205.9	7462.8	7739.8	59
min.	M. P.	min.												
D. I.	65	66	67	68	69	70	71	72	73	74	75	76	77	D. I.

MERIDIONAL PARIS.

D. l.	78	79	80	81	82	83	84	85	86	87	88	89	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.					
0	7744.6	8045.7	8375.3	8739.1	9145.5	9605.9	10137.0	10764.7	11532.6	12522.3	13916.6	16299.8	0
1	7749.4	8051.0	8381.1	8745.5	9152.7	9614.1	10146.6	10776.2	11547.0	12541.4	13945.4	16357.5	1
2	7754.2	8056.2	8386.8	8751.9	9159.9	9622.6	10156.2	10787.7	11561.4	12560.7	13974.4	16416.3	2
3	7759.0	8061.5	8392.6	8758.3	9167.2	9630.6	10165.8	10799.3	11575.9	12580.0	14003.7	16476.1	3
4	7763.9	8066.8	8398.8	8764.8	9174.4	9638.9	10175.4	10810.8	11590.5	12599.5	14033.2	16537.0	4
5	7768.7	8072.0	8404.1	8771.2	9181.6	9647.2	10185.1	10822.6	11605.0	12619.1	14063.0	16598.6	5
6	7773.5	8077.3	8409.9	8777.7	9188.9	9655.5	10194.8	10834.2	11619.7	12638.8	14093.0	16662.0	6
7	7778.4	8082.6	8415.8	8784.1	9196.2	9663.8	10204.6	10845.9	11634.5	12658.6	14123.3	16726.2	7
8	7783.2	8087.9	8421.6	8790.6	9203.5	9672.2	10214.4	10857.7	11649.3	12678.6	14153.9	16791.7	8
9	7788.1	8093.2	8427.4	8797.1	9210.8	9680.6	10224.2	10869.6	11664.1	12698.6	14184.7	16858.5	9
10	7793.0	8098.5	8433.3	8803.6	9218.1	9689.0	10234.0	10881.4	11679.1	12718.8	14215.8	16926.5	10
11	7797.8	8103.8	8439.1	8810.1	9225.4	9697.4	10243.8	10893.3	11694.0	12739.1	14247.2	16995.6	11
12	7802.7	8109.2	8445.0	8816.6	9232.7	9705.8	10253.7	10905.2	11709.1	12759.5	14278.0	17066.9	12
13	7807.6	8114.5	8450.9	8823.2	9240.2	9714.2	10263.6	10917.2	11724.2	12780.0	14310.9	17140.3	13
14	7812.5	8119.8	8456.8	8829.7	9247.6	9722.7	10273.5	10929.1	11739.4	12800.7	14343.2	17213.2	14
15	7817.4	8125.2	8462.6	8836.3	9255.0	9731.2	10283.5	10941.2	11754.7	12821.5	14375.8	17288.7	15
16	7822.3	8130.6	8468.6	8842.8	9262.4	9739.7	10293.5	10953.3	11770.0	12842.5	14408.7	17366.0	16
17	7827.2	8135.9	8474.5	8849.4	9269.9	9748.3	10303.5	10965.5	11785.4	12863.5	14441.9	17445.0	17
18	7832.2	8141.3	8480.4	8856.0	9277.3	9756.8	10313.6	10977.7	11800.9	12884.7	14475.4	17525.9	18
19	7837.1	8146.7	8486.3	8862.6	9284.8	9765.4	10323.7	10989.9	11816.4	12906.0	14509.5	17608.7	19
20	7842.0	8152.1	8492.3	8869.3	9292.3	9774.0	10333.8	11002.2	11832.0	12927.4	14543.5	17694.6	20
21	7847.0	8157.5	8498.2	8875.9	9299.8	9782.7	10344.0	11014.5	11847.6	12948.9	14578.1	17780.5	21
22	7851.9	8162.9	8504.2	8882.6	9307.3	9791.3	10354.1	11026.9	11863.4	12970.6	14613.0	17869.9	22
23	7856.6	8168.3	8510.2	8889.2	9314.8	9800.0	10364.3	11039.3	11879.2	12992.5	14648.3	17961.6	23
24	7861.6	8173.7	8516.2	8895.9	9322.4	9808.6	10374.5	11051.7	11895.1	13014.4	14683.9	18055.8	24
25	7866.6	8179.2	8522.2	8902.6	9330.0	9817.3	10384.8	11064.2	11911.0	13036.6	14719.9	18152.6	25
26	7871.6	8184.6	8528.2	8909.3	9337.6	9826.1	10395.0	11076.8	11927.1	13058.8	14756.3	18252.3	26
27	7876.6	8190.1	8534.2	8916.0	9345.2	9834.8	10405.3	11089.3	11943.1	13081.2	14793.0	18354.9	27
28	7881.8	8195.5	8540.2	8922.7	9352.8	9843.6	10415.7	11102.0	11959.3	13103.8	14830.2	18460.7	28
29	7886.8	8201.0	8546.2	8929.5	9360.4	9852.4	10426.2	11114.6	11975.6	13126.5	14867.8	18569.8	29
30	7891.8	8206.5	8552.3	8936.2	9368.1	9861.3	10436.6	11127.4	11991.9	13149.3	14905.8	18682.5	30
31	7896.8	8212.0	8558.4	8943.0	9375.8	9870.1	10447.1	11140.1	12008.4	13172.3	14944.2	18799.1	31
32	7901.9	8217.5	8564.4	8949.8	9383.5	9879.0	10457.5	11152.9	12024.9	13195.5	14983.0	18919.7	32
33	7906.9	8223.0	8570.5	8956.6	9391.2	9887.8	10468.0	11165.8	12041.5	13218.8	15022.3	19044.7	33
34	7911.9	8228.5	8576.6	8963.4	9398.9	9896.7	10478.5	11178.7	12058.2	13242.3	15062.1	19174.4	34
35	7917.0	8234.1	8582.7	8970.2	9406.6	9905.7	10489.1	11191.7	12074.9	13265.9	15102.3	19309.2	35
36	7922.1	8239.6	8588.9	8977.1	9414.4	9914.6	10499.7	11204.7	12091.7	13289.7	15143.0	19449.5	36
37	7927.1	8245.1	8595.0	8983.9	9422.1	9923.6	10510.4	11217.7	12108.6	13313.7	15184.2	19595.8	37
38	7932.2	8250.7	8601.1	8990.8	9429.9	9932.7	10521.1	11230.8	12125.6	13337.8	15225.8	19748.6	38
39	7937.3	8256.3	8607.3	8997.7	9437.8	9941.7	10531.8	11244.0	12142.7	13362.1	15268.0	19908.5	39
40	7942.4	8261.8	8613.5	9004.6	9445.6	9950.8	10542.6	11257.2	12159.9	13386.6	15310.7	20076.4	40
41	7947.5	8267.4	8619.6	9011.5	9453.4	9959.8	10553.3	11270.5	12177.1	13411.2	15353.8	20252.5	41
42	7952.6	8273.0	8625.8	9018.4	9461.3	9968.9	10564.1	11283.8	12194.4	13436.1	15397.8	20433.3	42
43	7957.7	8278.6	8632.0	9025.4	9469.1	9978.0	10574.9	11297.1	12211.8	13461.1	15442.1	20635.1	43
44	7962.8	8284.2	8638.2	9032.3	9477.0	9987.2	10585.8	11310.5	12229.3	13486.3	15486.9	20843.5	44
45	7968.0	8289.9	8644.5	9039.3	9484.9	9996.3	10596.7	11324.0	12246.9	13511.6	15532.6	21065.4	45
46	7973.1	8295.5	8650.7	9046.3	9492.9	10005.5	10607.6	11337.6	12264.6	13537.0	15578.7	21302.5	46
47	7978.2	8301.1	8656.9	9053.3	9500.8	10014.8	10618.6	11351.1	12282.4	13562.8	15625.5	21557.5	47
48	7983.4	8306.8	8663.2	9060.3	9508.8	10024.0	10629.7	11364.8	12300.2	13588.9	15672.7	21832.5	48
49	7988.5	8312.4	8669.5	9067.3	9516.8	10033.3	10640.8	11378.4	12318.1	13615.1	15721.0	22131.6	49
50	7993.7	8318.1	8675.7	9074.4	9524.8	10042.6	10651.9	11392.2	12336.3	13641.4	15769.8	22459.3	50
51	7998.9	8323.8	8682.0	9081.4	9532.9	10051.9	10663.0	11406.0	12354.4	13667.8	15819.3	22821.5	51
52	8004.0	8329.4	8688.3	9088.5	9540.9	10061.3	10674.1	11419.8	12372.7	13694.5	15869.4	23226.4	52
53	8009.2	8335.1	8694.6	9095.6	9548.9	10070.6	10685.3	11433.7	12391.0	13721.5	15920.4	23685.4	53
54	8014.4	8340.8	8701.0	9102.7	9557.0	10080.0	10696.5	11447.7	12409.5	13748.9	15972.1	24215.3	54
55	8019.6	8346.6	8707.3	9109.8	9565.1	10089.4	10707.7	11461.7	12428.0	13776.1	16024.6	24842.1	55
56	8024.8	8352.3	8713.6	9116.9	9573.2	10098.9	10719.1	11475.8	12446.5	13803.7	16077.9	25609.2	56
57	8030.0	8358.0	8720.0	9124.0	9581.4	10108.4	10730.4	11489.9	12465.3	13831.5	16132.0	26598.2	57
58	8035.3	8363.7	8726.4	9131.2	9589.5	10117.9	10741.8	11504.1	12484.2	13859.6	16187.0	27992.1	58
59	8040.5	8369.5	8732.7	9138.4	9597.7	10127.4	10753.3	11518.3	12503.1	13887.8	16242.9	30375.0	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.					
D. l.	78	79	80	81	82	83	84	85	86	87	88	89	D. l.

N.B. In this table D. l. stands for degree of lat. and M. P. for meridional parts. In using it, seek the degrees of latitude at the top or bottom, and the minutes in the right or left hand columns; and the corresponding meridional parts will stand right against the minutes, and in the column signed with the degree proposed.

Having the latitude of two places, to find the meridional miles or minutes between them; consider whether the places be one under the equinoctial, and the other wide of it; or the one on the one side of the equinoctial, and the other on the other; or whether they both lie on the same side.

If one place lie under the equator, the meridional minute next under the degree of latitude of the other place, is the meridional difference of latitude, or latitude enlarged. If one be in north, and the other in south latitude, the meridional minutes, corresponding to the two latitudes, added together, give the meridional minutes between them.

Both places lying towards the same pole, subtract the meridional parts answering to the less latitude from those of the greater, the remainder gives the meridional minutes. See SAILING.

In the Philosophical Transactions, No. 219, Dr. Halley has given a very curious paper relating to the division of the nautical meridian, by a quite different method from Mr. Wright's; and containing a method of performing the problems of sailing according to the true chart, by the help of Briggs's, or the common table of logarithmic tangents, without a table of meridional parts. Dr. Halley avails himself of a principle, first accidentally discovered by Mr. Henry Bond, and published about the year 1645, that the meridian line was analogous to a scale of logarithmic tangents of half the complements of the latitude. This analogy was first demonstrated by Mr. James Gregory, in his "Exercitationes Geometricæ," published in 1688, and more elegantly and concisely by Dr. Halley himself; who has also shewn (ubi supra) how to apply this analogy, by means of any system of logarithms, for computing the interval of the meridional parts answering to any two given latitudes. The reader may find this subject well illustrated by Mr. Robertson in his Elements of Navigation, book viii. p. 142, &c. See also Phil. Transf. vol. xlvi. p. 559, &c.

To find the meridional parts to any spheroid, with the same exactness as in a sphere.

Let the semi-diameter of the equator be to the distance of the focus of the generating ellipse from the centre, as m to 1. Let A represent the latitude for which the meridional parts are required, s the sine of the latitude, the radius being unit; find the arc B , whose sine is $\frac{s}{m}$; take the logarithmic tangent of half the complement of B , from the common tables; subtract this logarithmic tangent from 10.000000, or the logarithmic tangent of 45° : multiply the remainder by $\frac{7915.7044678978}{m}$, &c. and the product

subtracted from the meridional parts in the sphere, computed in the usual manner for the latitude A , will give the meridional parts expressed in minutes for the same latitude in the spheroid, provided it be oblate.

Example:—If $m : 1 :: 1000 : 22$, then the greatest difference of the meridional parts in the sphere and spheroid is 76.0929 minutes; in other cases it is found by multiplying the remainder above mentioned by 1174.078.

When the spheroid is oblong, the difference of the meridional parts in the sphere and spheroid, for the same

latitude, is then determined by a circular arc. Phil. Transf. No. 461. sect. 14. See also Maclaurin's Fluxions, art. 195—899.

Mr. Murdoch has solved this problem by infinite series, and has computed a table of meridional parts for an oblate spheroid, such as is mentioned in the foregoing example. See his treatise, intitled "Mercator's Sailing applied to the true Figure of the Earth," Lond. 1741, 4to. See the article DEGREE.

MERJEIAH, in *Geography*, a town of Algiers; 80 miles E. of Oran.

MERIGHI, LA SIGNORA, in *Biography*, was announced in Handel's advertisements, on his return from Italy in 1729, where he had been to engage singers, as "a woman of a very fine presence, an excellent actress, and a very good singer, with a counter-tenor voice." We find afterwards, however, that she was only engaged as second woman under the Strada.

MERJIAN, in *Geography*, a town of Persia, in the province of Kerman; 55 miles N. of Kabis.

MERIM, a large lake of S. America, in Paraguay, near the coast of the S. Atlantic ocean. At the S. end stands fort St. Miguel, and at its northern extremity fort Mangaveira. Parallel to it, and between it and the ocean, is another lake nearly as long. The forts command the extremities of the peninsula.

MERIMEG, or MARAMAG, a large river of Louisiana, which runs into the Mississippi, below the mouth of the Missouri.

MERINDAPILLY, a town of Hindoostan, in Baramaul; 25 miles N.W. of Darempoury.

MERINO-SHEEP, in *Agriculture*, a breed of fine-woolled sheep lately introduced from Spain, hence sometimes termed the *Spanish breed*. They are characterised by the males having horns, but the females being sometimes without them, by having white faces and legs, the latter rather long, the body not very perfect in shape, fine in the bone, some degree of throatiness, the pelt fine and clear. The weight, when fattened in some degree, in the rams about 17lbs., in the ewes 11lbs. the quarter. The wool is very fine. They are said to be hardy, and to have the property of fattening in a pretty expeditious manner. See MESTA, and SHEEP.

MERION, UPPER and LOWER, in *Geography*, two townships of America, in Montgomery county, Pennsylvania; the first has 993, and the latter 1422 inhabitants.

MERIONETHSHIRE, one of the counties of North Wales, is bounded on the W. by the extensive bay of Cardigan, which forms part of the Irish sea; on the N. by Denbighshire and Caernarvonshire; on the E. by Montgomeryshire; and on the S. by the river Dovey, which divides it from Cardiganshire. This county extends in length, from Beddgelert, near Snowdon, to Bwlch y Vedwen, on the confines of Montgomeryshire, 43 miles; in breadth, from Harlech to the extreme boundary of Llangollen parish, 38. It is called by the natives Meironydd, and is the only county in Wales which, with the addition of the word shire, still retains its ancient appellation. This name is said to be derived from Meirion, the son of Tibravn, and grandson of Cunedda, a distinguished British chieftain of the fifth century, who, having assisted the Welsh in rescuing their country from the depredations of a band of Irish marauders, received from them a large extent of territory as the reward of his services.

The early history of this county is equally as obscure as that of any other in Wales. That it was known to the Romans is evident from the many vestiges of their customs which are yet to be discovered in different parts of it. Of these the

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the principal are, the fortifications of Tommen-y-Bala, near Bala town; Caer-Gai, in the vicinity of Llanuwchllyn; Cefn-Carr, in the parish of Penul, and Tommen-y-Mur, near Fellinglog. The Roman road, denominated Sarn-Helen, can easily be traced from the fine station last mentioned, stretching itself towards Dinas Emrys, Caernarvonshire. From this road two branches appear to have struck off in this neighbourhood, one of which led to Conovium, and the other to Segontium. During the Saxon and Norman dynasties, history is nearly silent concerning Merionethshire, but the numerous fortifications which cover its hills plainly evince that it did not in these ages escape the ravages of war. At a later period it was the scene of many of the daring exploits of the celebrated Owen Glyndyr, who so vigorously espoused the cause of the unfortunate Richard II.

The general aspect of Merionethshire differs in some respects from that of the other counties in North Wales. For the most part it is extremely mountainous, but its mountains are less elevated, with the exception of a few points, than those of the adjacent county of Caernarvon. The highest hill, however, called Cader-Idris, is inferior in height only to Snowdon. This mountain, according to tradition, was so called from being the favourite seat of Idris, who was a great prince, poet, astronomer, and philosopher in ancient times. Its highest peak is said to be two thousand eight hundred and fifty feet above the level of the town of Dolgellau, which is situated near its base. The other principal eminences are Aren-Vowdhwy, Aren-Benllyn, Aren-nig, Moelwyn, Manod, &c.: these rear their lofty heads over a profusion of lower hills, which are intersected by some beautiful vallies, and are interspersed with woods, lakes, rivers, rivulets, and cataracts.

The principal river in this county is the Dee, which takes its rise from several springs on the declivity of the lofty Aren. These quickly uniting their streams enter the lake, called by the Welsh Llyn-tegid, and by the English Pimblemeer, and from thence flow through the beautiful vale of Ederion, towards Corwen, a little below which town it enters Denbighshire. The Dee, in its course through this county, forms several fine cataracts. That called Rhaiadrdu, or the Black-Cataract, from the colour of its waters, is situated in the vicinity of Dolgellau, and is a double fall about sixty feet in height, where the river dashes rapidly over a series of black rugged rocks, which are covered in many places with white lichens, and thus give a peculiar appearance to the scene. The other rivers of importance besides the Dee are the Maw or Mawddach, the Dovey or Duff, and the Glaslyn and Dwyrid, the two last of which form a junction, and passing Traeth-Mawr and Traeth-Bychan, empty their waters into the Irish sea. There is in this county a variety of lakes: the principal ones are Llyn-tegid near Bala, and Llyn-Tallyllyn at the southern foot of Cader Idris.

From the mountainous nature of Merionethshire it may naturally be supposed that it is not destined to reach any high degree of agricultural improvement. Mr. Davies, in his enlightened Survey of North Wales, estimates the number of acres in the whole county at 430,000, and states that out of these not above 146,000 acres are inclosed. The soil is various, but in general extremely poor. The hilly districts, where covered with soil, are in general too steep and rugged to admit of culture. By far the greater proportion of the low grounds consists of peat earth, forming bogs and turbaries. In some few places attempts have been made by different individuals to bring a part of these waste lands into cultivation, but their progress has by no means answered

their expectations, though some advantages have certainly been gained. The attention of the inhabitants therefore is chiefly directed to the rearing and feeding of cattle, sheep, and goats, of which a great number are exchanged for the commodities of more fertile, or more commercial districts. The cultivated spots lie chiefly on the sea-coast, and on the skirts of the county. In the vallies, and on the sides of the hills, in many parts there appear considerable plantations of wood, both natural and raised by art.

Notwithstanding the apparently favourable character of this county for the productions of the mineral kingdom, it is remarkable that few mines of any importance have been discovered in it. The district abounds indeed with numerous veins, both of lead and copper ore, but they are generally either so peculiarly placed, or so limited in extent, as to deprive the adventurer of any fair prospect of remuneration for the expence and trouble of opening them. Sulphat of copper, in particular, is found at Aberdyfo, and at Buddugr and Clogiau mines near Dolgellau. The two latter are the principal in Merionethshire, and perhaps the only ones which are wrought with any degree of spirit or profit. At Moel-Isfri, in the parish of Llanelyd, Pont-yr-avonddu, Buleh-y-plwm, and Craig-wen, near Dinas-mowddwy, are the chief veins of lead. The same metal also abounds at Melin, Illyw-y-pair, in the parish of Tywyn, and at Bryndinas, near Dyffryn-gwyn.

This county possesses no iron ores, and can only boast of one insulated white lime rock at Gwerclas, near Corwen, in which about 50,000 bushels are annually burnt. Merionethshire affords no coal, so that peat forms the chief article for fuel.

But if the practical miner does not discover here such exhaustless stores of useful metals as he might be led to expect upon a general view of the county, the scientific mineralogist will find ample materials for the illustration of his geological inquiries. The lofty mountain of Cader-Idris possesses numerous peculiarities, both of structure and composition; and affords several facts tending to support the Huttonian hypothesis. This eminence is the commencement of a chain of primitive mountains, which extend in a north-north-easterly direction towards the Arens and Arenig. It is extremely steep, and more craggy than the hills of secondary formation which surround it, and consists of siliceous porphyry, quartz, and feldspar, inclosed in a green paste, with siliceous schistose porphyry, intersected with veins of quartz and argillaceous porphyry in a mass, and a dark grey paste. Besides these species, some of the rocks likewise contain the component parts of granite and porphyry, together with the granitell in mass of Mr. Kirwan, composed of quartz and schorl. On the sides of the mountain lie a considerable quantity of stones, resembling lava; and hence some writers suppose it to have been at one time volcanic. But this supposition is unquestionably erroneous. The porous appearance of these stones has arisen from the circumstance of the feldspar which intersected the quartz having been decomposed. On the south side of the mountain, and near its apex, is a large lake, from which the rocks rise almost perpendicularly. On the north side is another lake: and at the summit is a mass of large stones, called Idris's chair. See Aikin's Tour in Wales.

In a level part of the county, called Towyn Meironydd, rises a very singular rock of immense size, and terminating in a conical form. Quartz constitutes the chief matrix of the lead and copper ores here. In some places several veins consist entirely of this mineral upon the surface. A line of dark coloured argillaceous limestone can be traced in a south-western direction, stretching through the whole extent of

the county to Cadair-Ddinmael, near Cerrig-Druidion. This lime is of little value, either as a cement or a manure.

Besides the Roman roads already mentioned, Merionethshire contains many interesting monuments of remote ages. Above Nannua, in the neighbourhood of Dolgellau, on a rocky eminence, is a vast collection of loose stones, which have evidently formed the rampart of a British post. The hill on which these stones are placed is emphatically denominated Moel-orthwm, or the hill of oppression. The remains of a castle, formerly of great strength and extent, occupy the top of the insulated rock near Towyn-Meirionydd, already noticed. It appears to have stretched longitudinally over the whole surface of the summit. One of the apartments, thirty feet in diameter, is excavated in the rock. In some parts, the lines of circumvallation consist of stones loosely piled on the edges of the precipices, but on other parts appear well built walls of squared stones, cemented with mortar composed of calcined shells and gravel. According to Mr. Pennant, this castle was anciently called Castle-bere, and was granted by Edward I. to the custody of Robert Fitzwalter. The same author likewise supposes, from its present name Teberri, that it may have been the fortrefs belonging to the last Llewellyn, which was taken only a short time previous to the final conquest of Wales by William de Valence, earl of Pembroke. This conjecture, however, is extremely questionable. St. Cadwan's stone, in the church-yard of Towyn, is traditionally reported to have been erected, in honour of that saint, in the sixth century. In the parish of Llanelltyd are the ruins of Cynmer-abbey, founded by two Welsh princes in 1198. On the mountain called Mikneint, near Rhyd-ar-Helen, stand some remarkable stone monuments, at least thirty in number. Each separate grave has four stones, one at each corner, resembling small square pillars, two or three feet high, and about nine inches broad. Tradition says they serve to commemorate some persons of note, who fell in the battle fought here between the men of Dyffryn-Ardwdwy, and some of Denbighshire. A considerable number of similar monuments are found likewise in the parish of Trawsfynudd. Several stone circles appear in the vicinity of these graves, the largest about fifty-two feet in diameter, and a vast carnedd, with two upright stones; also several smaller circles, the whole apparently surrounded by one of much greater circumference. Near Rhuw-goch is a small fort, in a singular position, on a circular isolated rock, resembling an artificial mount, between the hills, evidently intended for the defence of the pass. Some persons have supposed that this was of British construction, but the regularity of its facings, and the numerous coins which have been found in its neighbourhood, seem to imply that it was of Roman formation. Besides, in the inclosed country immediately adjacent, is a large encampment, undoubtedly the work of that illustrious people. This commands a variety of passes, which are defended by minor posts. At one extremity of the vale of Maentwrog is a large upright stone, called Maen-twrog, which is supposed to be the monument of a saint so named, who was contemporary with St. Beuno. The large artificial mount called Tomen-y-Bala, near the lake of Bala, is supposed to have been originally Roman, but afterwards to have been occupied by the Welsh during their conflicts with the English. Situated on an eminence fronting the town of Corwen, is the British post called Caer-Drewin, which consists of a circular wall, about a mile and a half in circumference, and is supposed by Mr. Pennant to have been one of those strong holds in which the Welsh secured their families and their property, in the event of an invasion. Lyttelton conjectures that Owen Gwynedd occupied this post, while Henry II. encamped on

the opposite side of the vale, from whence however he was forced to return to England in chagrin, without being able to strike a single blow. It was afterwards the retreat of the brave and heroic Owen Glyndwr, whose memory continues to be highly revered by the inhabitants of the surrounding district. Harlech castle has been already described under the word HARLECH. This county is not distinguished for its manufactures; but at Bala and Dolgellau, some strong cloths, druggets, kerfimeres, flannels, &c. are made. Bala is particularly noted for its stockings and wigs.

The political divisions of this county have varied at different periods. At present it comprehends five comots, or hundreds, *viz.* Ardwdwy, Penllyn, Estumaner, Edernion, and Talybont; 37 parishes, and seven market-towns; *viz.* Harlech, Bala, Dolgellau, Dinas-y-Mowddu, Corwen, Tywen or Towyn, and Barmouth. Harlech, the county-town, is but a poor place, though governed by a mayor. Barmouth is the only port in the county. Dolgellau is distinguished as the place where the summer assizes are held, and is perhaps the most thriving town in Merionethshire. Bala is likewise a thriving town. Dinas-Mowddu, although now a mean town, was anciently a fortified city, and the residence of a Welsh prince or chieftain. It is still a corporate town, with a mayor, alderman, recorder, and several burgesses. The mayor has the right of trying criminals, but of late years that privilege has not been put in practice. He still, however, retains all the insignia of his magisterial office. Besides these towns there is a variety of villages dispersed through different parts of the county. Of these, Festiniog and Mallwyd are remarkable for the beauty of their situations, and noble prospects which they command. Festiniog has been celebrated by several authors, but more especially by lord Lyttelton. The vale in which this stands has been compared to the celebrated vale of Tempe, and it must be confessed that few spots in this island can boast of such varied and romantic scenery.

According to the parliamentary return of 1801, this county contained 5980 houses, and 29,506 inhabitants, of whom 13,896 were males, and 15,610 females. The number engaged in agriculture was 10,308, and in commerce and manufactures 2711. Pennant's Tour in Wales. Carlisle's Topographical Dictionary of Wales. Aikin's Tour in Wales.

MERIS, *μερίς*, a part, in *Music*, an appellation given by Mr. Sauveur to the forty-third part of an octave. See Mem. Acad. Scienc. 1701.

MERISMA, in *Botany*, from *μερισμοεις*, a division, alluding to the divided or branched nature of this fungus.—Perf. Syn. 582.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Branching, leathery, compressed, even; for the most part hairy at the top.

This genus consists of seven species in Perfoon, differing from *Clavaria* chiefly in their compressed dilated form, for the hairiness is avowedly not constant. Examples may be seen in

M. cristatum. Perf. n. 3. (*Clavaria laciniata*; Bull. t. 415. f. 1. Sowerb. t. 158.)—Somewhat decumbent, incrusting other plants, pale; its branches lacinated, tumid, rugose. Found in woods, running over every thing that comes in its way, like a stalactitical concretion, and throwing out variously dilated, sharply jagged, fan-like branches. The whole is of a pale whitish hue, and faint smell and taste.

M. fatidum. Perf. n. 7. (*Clavaria anthocephala*; Bull. t. 452. f. 1. Sowerb. t. 156)—Purplish-brown. Branches palmate, crowded, whitish and polished at their tips.—Not infrequent on the ground in fir woods. It is of a tough

woody texture, and about two inches high, of a nauseous scent when fresh. The whole is of a palmate figure, stalked, with many crowded, fan-like branches, various in diameter, whitish at their summits, which are abrupt and notched.

MERIT, in *Theology*, is used to signify the moral goodness of the actions of men, and the reward due to them.

The Romish schoolmen distinguish two kinds of merit towards God: the one of *congruity*, the other of *condignity*.

MERIT of *Congruity* is when there is no just proportion between the action and the reward; but he who bestows the reward supplies, by his goodness or liberality, what was wanting in the action. Such is the merit of a son towards his father: but this is only merit in an improper sense.

MERIT of *Condignity* is when there is an absolute equality and a just estimation between the action and the reward: as in the wages of a workman.

Those of the reformed religion disclaim all merit of condignity towards God; even their best works, they own, do not merit at his hands. Hence the doctrine of condign merits makes one of the great articles of controversy between the Romish and reformed churches.

MERIT, *Order of*, was instituted by Frederick, king of Prussia. The ensign of the order is a star of eight points enamelled blue, and edged with gold; on the centre the letters F.R. in a cypher; in each angle an eagle displayed fabule; on the upper two points, the regal crown of Prussia; on the reverse, in enamel, this motto, POUR LE MERITE. It is worn round the neck, pendent to a black ribbon, edged with silver.

MERIT, *Military Order of*, in Hesse Cassel, was instituted by the late landgrave. The badge is a gold star of eight points enamelled white; on the centre this motto, VIRTUTE ET FIDELITATE. It is worn at the button-hole, pendent to a blue ribbon, edged with silver.

MERIT, *Military, the Order of*, was instituted in France, in the year 1759, by Louis XV. in favour of those officers of his army who were Protestants. The marks of honour are the same with those of the order of *St. Louis*. The ensign of the order is also of the same form as that of *St. Louis*, with this difference, that on one side is "a sword in pale," within this motto, PRO VIRTUTE BELLICA: and on the reverse is a chaplet of laurel: within this inscription, LUD. XV. INSTITUIT, 1759.

MERKA, in *Geography*, a town of Prussia, in the palatinate of Culm; 10 miles N.N.E. of Thorn.

MERKENDORF, a town of Germany, in the margravate of Anspach; 7 miles S.E. of Anspach.

MERKET ISLANDS, a cluster of small islands in the Red sea, near the coast of Arabia. N. lat. 18° 10'.

MERKLIN, a town of Bohemia, in the circle of Pilsen; 15 miles S.S.W. of Pilsen.

MERLANGUS, in *Ichthyology*, a name given by Belonius and some other authors, to a small species of whiting, or *afellus mollis*, called by the Venetians *mollo*, and by some other nations the *capelon*. See *GADUS minutus*.—Also, the name of the common whiting, a species of *Gadus*; which see.

MERLENGO, in *Geography*, a town of Italy, in the department of the Mincio; 10 miles N. of Mantua.

MERLERA, a small island in the Mediterranean, four miles from cape Sidero, on the N. coast of Corfu.

MERLERAULT, a town of France, in the department of the Orne, and chief place of a canton, in the district of Argentan; 18 miles N.N.E. of Alençon. The place contains 1222, and the canton 8098 inhabitants, on a territory of 177½ kilometres, in 19 communes.

MERLIN, AMBROSE, in *Biography*, a British writer,

who flourished in the fifth century, was regarded as a prophet and magician. Strange stories are told of him by ancient writers, some of whom have assumed that he conveyed by enchantment the stupendous stones on Salisbury plain from Ireland. There are likewise certain extravagant predictions that pass under his name, printed at Paris in 1530. Near Caermarthen is a mount called Merlin's Hill, beneath which it is said the prophet was buried.

MERLIN, in *Ornithology*, the name of the yellow-legged falcon. See *FALCO Æfalon*.

MERLINGEN, in *Geography*, a town of Switzerland, in the canton of Bern; 7 miles S.E. of Thun.

MERLOM, a town of Hindoostan, in Dowlatabad; 12 miles S.E. of Bader.

MERLON, in *Fortification*, that part of the parapet, from fifteen to eighteen feet in length, which lies betwixt two embrasures.

The word comes from *merula*, or *merla*, which, in the corrupt Latin, was used for a battlement.

To flake out the merlons, measure from each end of the wall, twelve feet, there stick a stake, and plant other stakes at every intermediate eighteen feet: when this is done on the inside of the wall, let other stakes be planted on the outside, either directly opposite to the former, or in the line towards the place where the gun is more particularly intended to deliver its shot. Plant other stakes on the inside, one a foot distant on each side of the former, and this will leave spaces of two feet each for the inner opening of embrasures: then, on the outside, plant other stakes at five or six feet distance from the former ones, one on each side, and the spaces of ten or twelve feet will be marked out for the outside openings of the embrasures. In the direction of the pickets, which limit the inner and outer openings of the embrasures, let single rows of fascines be staked down across the wall, and these will be the sides of the embrasures: fill the intermediate spaces, or merlons, with rows or fascines laid lengthwise to the wall, and this will be the first floor of the merlon, which is to be picketed down, and the hollows filled with earth. Let other floors be raised in like manner, until the merlons are carried up to about five or six feet, or more if necessary; and on the top of each let a bed or floor of earth be laid of about eight or twelve inches thick.

MERLON, or *Mellon*, in *Geography*, a town of France, in the department of the Oise; seven miles S. of Clermont.

MERLUCIUS, *Gadus merluccius* of Linnæus, in *Ichthyology*, the name of a fish commonly called the *bake*, and by some authors the *afellus alter*.

It is a moderately large fish, growing to two feet or more in length, and resembling the common pike in figure, from whence it has its name, *merlucius*, *quasi maris lucius*, the *sea-pike*. See *GADUS Merluccius*.

MERMAID, or MERMAN, a sea-creature, frequently talked of, and supposed half human and half a fish.

However naturalists may doubt of the reality of *mermen*, or mermaids, if we might believe particular writers, there seems testimony enough to establish it. In the year 1187, as Larrey informs us, such a monster was fished up in the county of Suffolk, and kept by the governor for six months. It bore so near a conformity with man, that nothing seemed wanting to it besides speech. One day it took the opportunity of making its escape, and plunging into the sea, and was never more heard of. Hist. d'Angleterre, p. 1, p. 403.

In the year 1430, we are told, that, after an huge tempest, which broke down the dykes in Holland, and made way for the sea into the meadows, &c. some girls, of the town of Edam, in West-Friesland, going in a boat to milk their

cows, perceived a mermaid embarrassed in the mud with a very little water. They took it into their boat, and brought it with them to Edam, dressed it in women's apparel, and taught it to spin. It fed like one of them, but could never be brought to offer at speech. Some time after it was brought to Haerlem, where it lived for some years, though still shewing an inclination to the water. Parival relates that they had given it some notions of a deity, and that it made its reverences very devoutly whenever it passed by a crucifix. (Delices d'Hollande.) In the year 1560, near the island of Manar, on the western coast of the island of Ceylon, some fishermen are said to have brought up, at one draught of a net, seven mermen and maids; of which several Jesuits, and among the rest F. Hen. Henriques, and Dimas Bosquez, physician to the viceroy of Goa, are said to have been witnesses. And it is added, that the physician, who examined them with a great deal of care, and made dissections thereof, asserted that all the parts, both internal and external, were found perfectly conformable to those of men. See the Hist. de la Compagne de Jesus, p. ii. tom. iv. N^o 276, where the relation is given at length.

We have another account, as well attested, of a merman, near the great rock called Diamond, on the coast of Martinico. The persons who saw it gave in a precise description of it before a notary: they affirmed, that they saw it wipe its hands over its face, and even heard it blow its nose.

Another creature, of the same species, was caught in the Baltic, in the year 1531, and sent as a present to Sigismund king of Poland, with whom it lived three days, and was seen by all the court. And another very young one was taken near Rocca de Sintra, as related by Damian Goes.

The king of Portugal, and the grand-masser of the order of St. James, are said to have had a suit at law, to determine which party these monsters belonged to. See SEA-CÖW, and SIREN. See Pontoppidan's Nat. Hist. of Norway, vol. ii. p. 186, &c.

MERMEREDGIK, in *Geography*, a town of Asiatic Turkey, in Natolia; 44 miles E. of Smyrna.

MERO, a district of Tennessee, in America, on the banks of Cumberland river, comprehending seven counties and 32,178 inhabitants, of whom 8074 are slaves.

MERO Point, a point on the coast of Peru, in the South Pacific ocean, between cape Blanco to the S.W., and Tumber river to the N.E., on the S.E. side of Guayaquil bay. S. lat. 3^o 40'.

MERO Motu. See *Ex Mero*.

MEROCELE, from $\mu\epsilon\rho\sigma$, the thigh, and $\kappa\epsilon\lambda\eta$, a tumour, in *Surgery*, the crural or femoral rupture. See HERNIA.

MÉROLA, in *Geography*, a river of Naples, which runs into the Adriatic, N. lat. 42^o 6'. E. long. 14^o 55'.

MEROPE, a town of Peru, in the diocese of Truxillo; 12 miles N.W. of Lambayeque.

MEROPS, the Bee-eater, in *Natural History*, a genus of birds of the order Picæ: bill curved, quadrangular, compressed, carinate, pointed; nostrils small, at the base of the bill; tongue slender, the tip generally, jagged; feet gresatorial. There are twenty-six species. The birds of this genus, with a few exceptions, inhabit the old continent. Their general food is insects, and they are particularly fond of bees and wasps. They have no note beyond a whistle, and that far from an agreeable one. Like the king-fisher, they breed in holes in the banks of rivers.

Species.

* APIASTER. Back ferruginous; belly and tail blueish-green; two of the tail-feathers longer; chin pale yellow.

A variety occurs with the bill convex and uncarinated, and the toes unconnected at the last joint. Bill black; irids red; front blue-green; crown, hind-head, and neck bay; a black streak from the bill to the hind-head; tail wedged, the feathers edged within with cinereous; legs chestnut; claws reddish-black. This is one of the most elegant of the European birds, and, next to the roller and king-fisher, may be regarded as the most brilliant in point of colour. This bird is a native of the warmer parts of Europe, and of many parts both of Asia and Africa. It is rarely seen in the northern regions of Europe. In Greece, and among the islands of the Archipelago, it seems to be extremely common, and we are told by Belon, that in the island of Crete the inhabitants practise a curious mode of catching it by means of a cicada, fastened on a bent pin, or a fish hook, and tied to a long line; the insect is then thrown into the air, and flies with great rapidity, and the bee-eater, ever on the watch for insects, seeing the cicada, springs at it, and swallowing the bait, is thus taken by the Cretan boys. It has been seen in Sweden; and in the third volume of the Transactions of the Linnæan society, it is asserted that a flight of these birds, not less than twenty in number, was seen near Mattishall in Norfolk, in the month of June 1793, and again in the following October. They feed, on the wing, upon bees, gnats, flies, and other insects. Their nest is composed of moss, and the eggs, from five to seven, are perfectly white, and about the size of those of a hare. When the sun shines upon them, in their flight, they are a pleasing object, as they appear gilded. It is recorded by Kolben, the historian of the Cape of Good Hope, that bee-eaters guide the Hottentots to the honey, which the bees lay up in clefts of the rocks.

VIRIDIS, Indian Bee-eater. Green; band on the breast black; chin and tail blue; two of the tail-feathers longer. It inhabits Bengal, and is eight or nine inches in length. Bill and band across the eyes are black; legs are brown. There are four other varieties of this species: in the *second*, the body is longer, front blue; in the *third*, the chin is yellow; line on the sides of the head black; quill-feathers tipped with brown. It is found in Egypt. The bill is black, straight; tongue not jagged; legs flesh-colour; tail even; in the *fourth* variety, the chin and stripe beneath the eyes are blue; tail even; it is found in the Philippine islands; two middle tail-feathers are black; in the *fifth* and last variety, the front is of a pale yellow colour; chin blue, it inhabits India.

CONGENER, Yellow-headed Bee-eater. Yellowish; rump greenish; quill-feathers tipped with red; tail-feathers yellow at the base. Found in the southern parts of Europe. The band across the eyes is black; back and shoulders bay; lesser wing-coverts blueish, the greater are yellow; quill-feathers black; legs yellow. According to Gesner it is often seen in the neighbourhood of Strasburg.

SUPERCILIOSUS, Supercilious Bee-eater. Green, frontal line above and beneath the eyes white; chin yellowish; two of the tail-feathers longer. There is a variety of this species described as having a slenderer bill; an even tail, with a rump and tail of blue-green. It inhabits Madagascar, and is nearly a foot long. Bill and area of the eyes black; crown greenish-bay; the legs are brown, and claws black.

PHILIPPENSIS, Philippine Bee-eater. Green, beneath yellowish; rump blue; tail even. This, as its name imports, inhabits the Philippine islands, and is about eight or nine inches long. The bill and line through the eyes are black; legs and claws brown.

CINEREUS, Cinereous Bee-eater. Variegated red and yellow, beneath reddish-yellow; the two longest tail-feathers are red. Inhabits New Spain, and is between nine

and ten inches long. The bill is green; head, quill and lateral tail-feathers cinereous.

FLAVICANS, Yellow Bee-eater. Whitish; head varied with white and tawny; breast reddish; back yellow; rump, wings, and tail rufous; two middle tail-feathers very long. In Willughby's Ornithology this species is described as the second bird of Paradise of Aldrovandus. This naturalist says he observed it, in the year 1577, in the possession of a Roman knight of the name of Cavalieri. The head was nearly white, sprinkled with yellow, and gold-coloured spots; the eyes were luteous, with red eye-lashes; the bill between green and yellow, two fingers breadth long, and rather curved; the tongue red, longish, and sharp, not unlike that of a wood-pecker, and calculated for piercing; the breast reddish; the back, wings, and belly whitish, but the upper parts of the tips of the wings ferruginous; the upper part of the back yellowish, but becoming reddish or ferruginous at the rump; the tail-feathers were white at the base, but ferruginous for the remainder of their length, and the two middle feathers exceeded the others two palms in length. The wings in the figure of Aldrovandus appear very long in proportion to the bird, and the author says they measured five palms in length; the tail likewise, exclusively of the two middle feathers, appears of considerable length.

COROMANDUS, Coromandel Bee-eater. Yellowish; sides of the neck, wings, and tail yellow; wing-coverts, back, and rump waved blueish, ocular stripes black. Inhabits different parts of India and Coromandel, whence it derives its name. Bill and legs black; irid; pale rufous; chin greenish.

BRASILIENSIS, Brazilian Bee-eater. Varied brown and black; head, chin, lesser wing-coverts, and body beneath red; wings and tail blue. It is found, as its name imports, in Brasil; is about nine inches long; the bill, wings beneath, legs and claws yellow.

SUPERBUS, Superb Bee-eater. Front and rump blue; two middle tail-feathers longer. Bill blackish; quill-feathers edged with brown; lower half of the middle tail-feathers dark brown. The size of this splendid bird is nearly that of the common or European bee-eater.

BADIUS, Chestnut Bee-eater. Blue-green; head, neck, and shoulders chestnut coloured; tail-feathers above blue, beneath grey-brown; two middle tail-feathers longer pointed. There is a variety that has the wings and tail chestnut. It inhabits the isle of France. Bill black, band beneath the eyes brown; upper wing-coverts green, beneath tawny; quill-feathers beneath grey, four inner ones totally green; 13 middle ones tipped with black; tail-feathers grey at the inner edge; legs reddish; claws blackish.

CHRYSOCEPHALUS, Yellow-throated Bee-eater. Green-gold, beneath blue-green; head and neck tawny; chin yellow; two middle tail-feathers longer. It is found in different parts of Asia, and is about ten inches long. The front and eye-brows blue-green; upper tail-coverts green.

ANGOLENSIS, Angola Bee-eater. Glossy green-gold; band through the eyes cinereous, spotted with black; wings and wedged tail beneath cinereous; chin yellow; throat chestnut. It inhabits, as its name expresses, Angola, and is about five inches long. The bill and claws are black; legs cinereous; body beneath blueish.

ERYTHROCEPHALUS, Red-headed Bee-eater. Green, beneath yellowish; head and neck red; chin yellow; wings and even tail beneath cinereous. It is found in India, and is about six inches long. According to Brisson, the crown of the head and upper part of the neck are of a bright red; there is across the eyes a black streak; all the upper parts of the bird are of a fine green; the throat and under parts yellow, but slightly dashed, from the throat downwards,

with red; tail even at the end, and rather short; irides red; bill black; legs brown.

NUBIENSIS, Blue-headed Bee-eater. Blue green, beneath red; back, wings, and forked tail dirty red. It inhabits Nubia, and is ten inches long. The bill is black; great quill-feathers tipped with blueish-ash, the secondary are blackish; legs pale ash.

ERYTHROTERTUS, Red-winged Bee-eater. Olive, beneath whitish, chin yellow; wings and tail red, tipped with black. It was described by Buffon, from a specimen brought from Senegal by Adanson. Its total length was about six inches.

CAYANENSIS, Cayenne Bee-eater. Green; wings and tail rufous, the latter tipped with black. It is a native of Cayenne, from whence it derives its name. The bill is black; quill-feathers white at the base; the tail-feathers edged with black; legs yellowish.

SURINAMENSIS, Surinam Bee-eater. Variegated; head reddish; scrag greenish-yellow; quill-feathers greenish, varied with black and blue. An inhabitant of Surinam. The irides are chestnut and claws black.

NOVÆ ZEELANDIÆ, New Zealand Bee-eater. Glossy greenish-black; greater wing-coverts and tuft of curled feathers on each side the neck white; tail even, coverts blue. Is found in New Zealand; is about 11 inches long; sings well; is held sacred by the inhabitants; and the flesh is good. Legs and claws black; inside the mouth and tongue yellow, the latter tipped with black and beset with bristles; feathers of the neck lax, long, a little curled, with a longitudinal white streak through the shaft.

PHYGIUS, Embroidered Bee-eater. Black variegated with yellow. This beautiful species is the size of a thrush, and its black most elegantly variegated with bright and pale yellow; the sides of the head, round the eyes, are covered by a naked, yellow, granulated skin; the back and breast undulated by numerous pale or whitish-yellow crests, the tips of the black feathers being of that colour; the smaller wing-coverts are marked in a similar manner; the larger tipped with bright yellow, and the quill-feathers edged with the same colour, as are also the exterior tail-feathers; the bill is black, of a moderate length, and sharp-pointed; the legs are brown. It is a native of New Holland.

NIGER, Yellow-tufted Bee-eater. Black; a large tuft of feathers behind the wings and vent yellow; tail wedged, edged and tipped with white. Native of the Sandwich islands, where it is much esteemed on account of the tufts of yellow feathers beneath the wings, which are used in various ornamental articles of dress among the natives, and on that account Dr. Shaw says it might justify us in placing this species among a particular division of the genus *Certhia*. There are two other varieties, of which the *second* is known by having two middle tail-feathers uniform; and the *third* by its rufous flanks, and by its having all the tail-feathers uniform.

CARUNCULATUS, New Holland Bee-eater. Brown, belly yellow; wattles carunculate; tail wedged, tipped with white. It inhabits New Holland, and is described and figured in White's Voyage to New South Wales. It is somewhat of the size of a Mistle thrush, but much longer in proportion, measuring about fourteen inches. The feathers on the upper part of the head are longer than the rest, giving the appearance of a slight crest; the plumage of the bird is brown, the feathers long and pointed, and each feather has a white longitudinal streak; beneath the eye, on each side the head, beyond the base of the lower mandible, is a lengthened pendent wattle of an orange colour; the

middle of the belly is yellow, the tail wedge-shaped, like that of the magpie, and the feathers are tipped with white. The bill and legs are brown. In some individuals of this species a silvery streak appears beyond each side of the bill, and in the young birds the white streaks on the plumage terminate in a kind of dilated spot at the tip of each feather.

CORNICULATUS, Horned Bee-eater. Brown, head nakedish; body beneath and tips of the tail-feathers whitish; horn on the front obtuse. This is also an inhabitant of New Holland, and is described and figured by Mr. White. It is rather larger than a black-bird, the plumage above is brown, and beneath it is white; the head and upper part of the neck is sparingly covered with narrow white feathers, almost like hairs; but the fore-part of the neck and breast are furnished with long ones of a white colour with a dark middle streak, and pointed at the ends; its most remarkable feature is, that on the forehead, just at the base of the bill, there is a short blunt knob, about a quarter of an inch in height, and of a brownish colour; the tongue is nearly the length of the bill, and brittle at the end; the legs are dark brown.

GULARIS, Red-throated Bee-eater, and sometimes, from its colour, called the Black Bee-eater. Black; forehead and rump blue; belly spotted with blue; throat red. It inhabits Sierra Leona. In size it is rather smaller than the common bee-eater, and its prevailing colour is the finest velvet black; the forehead is of the richest blue, so also is the rump, surpassing that of the king-fisher; the throat is of a bright blood-red, the larger wing-coverts and middle quill-feathers bordered with bright ferruginous; the tail is even at the end; the bill and legs black.

RUFUS, Rufous Bee-eater. Quill-feathers brown, the outer edge rufous. Body beneath inclining to yellow; toes separated to the base; hind-claw longer. It is observed by Buffon, that as the toes in this species are not united, as in the rest of the genus, it seems to form as it were a connecting link, or shade, between the bee-eaters and the hoopoes.

MOLUCCENSIS, Molucca Bee-eater. Grey; orbits naked; cheeks black; tail subequal. It is a native of the Molucca islands, and is about 14 inches long. The bill is blackish, pervious, half covered with a membrane; tongue as long as the bill, fringed at the tip; some of the feathers of the cheeks are tipped with a silvery colour; legs dusky; outer toe connected with the middle one; hind-claw longer.

MONACHUS, Brown or Cowled Bee-eater. Described by Latham, white beneath, with black and somewhat downy head with raised crown. It is a large species, and a native of New Holland.

MALIMBICUS, Malimba Bee-eater. Sanguine rose coloured beneath, with black eye-stripe, white throat, and two lengthened tail-feathers. This is a native of Malimba, in Congo, Africa, where it continues only three months in the year; migrating in troops, flying with the swiftness of a swallow, feeding on insects, rarely perching on trees; nor on the ground any length of time.

MEROS, in *Ichthyology*, the name of a very large American fish, growing to five or six feet long, and called by the Brazilians *cugupu-guacu*. Its head is very large, and its mouth wide and toothless; its eyes have a black pupil and a yellow iris; it hath five fins, one running the whole length of the back and reaching nearly to the tail; the anterior part of this is narrow, and armed with small but sharp spines; the other part is broader, and sustained by softer rays; behind the anus is one like the hinder part of that on the back, and two others behind the gills, which are large and broad; the tail fin is very large and broad, and much more so at its extremity than at its origin; the scales are small; the head, back, and sides are of a brownish-grey;

and its belly white. It is accounted a well tasted fish. Ray. See *PERCA Guttata*.

MEROSAGLIA, in *Geography*, a town of the island of Corfica; 14 miles N.E. of Corte.

MEROVEUS, in *Biography*, king of France, or of the Franks, whose monarchy, at that time, was confined to both banks of the Lower Rhine, began his reign about the year 448. Little is known of his origin and descent, but the most probable opinion seems to be, that he was the younger of the two sons of Clodion, his predecessor, and that he obtained the crown of the Franks through the protection of Valentinian III., and his minister Aëtius. Attila supported the cause of his elder brother, and Meroveus was present as an ally of the Romans in the famous battle of Chalons, fought against that conqueror in 451. He afterwards probably extended his dominion in the provinces of Mentz and Rheims, to the banks of the Seine, and it has been said, that in consequence of his celebrity and renown, all the French kings of the first race bore the name of *Merovingian*, though others maintain that the appellation is older than this sovereign. He died about the year 456. Gibbon. Univer. Hist.

MEROVINGIAN CHARACTER, derives its name from Meroüce, the first king of France of that race, which reigned 333 years, from Pharamond to Charles Martel. This race is said by some to have terminated in Childeric III. A.D. 751. There are many MSS. in the French libraries still extant in this character. See *Speët. de la Nat.* vol. vii. p. 190.

MERRET, CHRISTOPHER, in *Biography*, a physician and naturalist, was born at Winchcombe, in Gloucestershire, in February 1614. He was educated at Oxford, being first entered at Gloucester hall, and subsequently removing to Oriel, and took the degree of M.D. in 1642, when he settled in London. He appears to have enjoyed a considerable share of practice in his profession, was a fellow of the College of Physicians, and one of the original members of the Philosophical Society, which after the restoration became the Royal Society. He died in 1695. Merret was a strenuous supporter of the exclusive rights of the college, and his first publication was "A Collection of Acts of Parliament, Charters, Trials at Law, and Judges' Opinions, concerning those Grants to the College of Physicians," 4to. 1660. This book became the basis of Dr. Goodall's History of the College, and it was followed, in 1669, by "A short View of the Frauds and Abuses committed by Apothecaries, in relation to Patients and Physicians." This publication involved him in an angry controversy with Henry Stubbe. He was known to the public, however, more reputationally as a naturalist, by the publication of his work, entitled "Pinax Rerum Naturalium Britannicarum, continens Vegetabilia, Animalia, et Fossilia in hac Insula reperta," Lond. 1667, 8vo. This, though a dry and incomplete catalogue, and abounding with errors, has the merit of being the first of the kind relating to this country, and was without doubt instrumental in promoting the study of natural history here. The botanical part is the fullest, consisting chiefly, however, of an alphabetical list, according to the Latin names. A great portion of his knowledge of plants was obtained through the medium of Thomas Willisel, a noted herbalist, whom he employed to travel through the kingdom for him during five summers. The zoological and mineral parts of his pinax are very meagre. Merret communicated several papers to the Royal Society, which are printed in the earlier volumes of the Philosophical Transactions; particularly an account of some experiments on vegetation; of the tin mines in Cornwall; of the art of refining; and some curious observations

vations relative to the fens of Lincolnshire. In 1662, he translated into English, Neri's work "De Arte Vitricaria." In 1686, an edition of the same work was published in Latin, with Merret's observations and notes; and subsequently a work was printed in German and French, comprehending all that had been written by Neri, Merret, and Kunckel, upon this art. Eloy Dict. Hist. Gen. Biog.

MERRIMACK, in *Geography*, a river of America, which is formed by the confluence of Pemigewasset and Winnipisaukee rivers in about N. lat. $43^{\circ} 26'$, and which pursues a southerly course through the state of New Hampshire, till it enters Massachusetts, and then turning easterly, passes into the ocean at Newbury-Port. It is navigable for vessels of burden about 20 miles from its mouth.

MERRIMACK, a township in Hillsborough county, New Hampshire, on the W. bank of Merrimack river; eight or ten miles S. of Amherst; containing 926 inhabitants.

MERRIMACHI, a river of America, which falls into the head of a bay of that name on the N.E. coast of the province of New Brunswick. From this river there is a communication with St. John's, partly by land, but principally by water carriage in canoes. The salmon fishery is carried on with success, and the cod-fishery is improving near the entrance of the bay.

MERRITCH, or **MERRICK**, a town of Hindostan, in the country of Viliapour, situated on the N. side of the Kistnah; 50 miles S.W. of Viliapour. N. lat. $16^{\circ} 58'$. E. long. $74^{\circ} 47'$.

MERRY, ROBERT, in *Biography*, was born in London, April 1755, and was descended in a right line from Sir Henry Merry, who was knighted by James I. at Whitehall. Mr. Merry's father was governor of the Hudson's Bay Company. His grandfather was a captain in the royal navy, and one of the elder brethren of the Trinity House; he established the commerce of the Hudson's Bay Company upon the plan which it now pursues. He made a voyage himself to Hudson's Bay, and discovered the island in the North seas, which still bears the name of Merry's island. He also made a voyage to the East Indies, and was, perhaps, the first Englishman who returned home over land; in which expedition he encountered inconceivable hardships. Mr. Merry's mother was the eldest daughter of the late lord chief justice Willes, who presided for many years with great ability in the court of Common Pleas, and was for some time first lord commissioner of the great seal. Mr. Merry was educated at Harrow, under Dr. Sumner. The celebrated Dr. Parr was his private tutor. From Harrow he went to Cambridge, and was entered of Christ's college. He left Cambridge without taking any degree, and was afterwards entered of Lincoln's Inn, but was never called to the bar. Upon the death of his father he bought a commission in the horse-guards, and was for several years adjutant and lieutenant to the first troop, commanded by Lord Lothian. Mr. Merry quitted the service and went abroad, where he remained nearly eight years; during which time he visited most of the principal towns of France, Switzerland, Italy, Germany, and Holland. At Florence he stayed a considerable time, enamoured (as it is said) of a lady of distinguished rank and beauty. Here he studied the Italian language, encouraged his favourite pursuit, poetry, and was elected a member of the academy Della Crusca; the name of which academy he afterwards used as a signature to many poems which were favourably received by the public, and which excited a great number of imitators. When Mr. Merry observed this, he dropped his fictitious character, and ever afterwards published in his own name.

Upon his marriage with Miss Branton, who performed in

his tragedy of Lorenzo, a prospect opened to him of living at his ease, by the joint production of that lady's talents, and his own pen; but unfortunately the pride of those relations upon whom he had most dependence was wounded by the alliance; and he was constrained, much against Mrs. Merry's inclination, to take her from the stage. This he did as soon as her engagement at the theatre expired, which was in the spring of 1792. They then visited the continent, and returned in the summer of 1793. They retired to America in 1796, and our author died suddenly at Baltimore, in Maryland, Dec. 24, 1798, of an apoplectic disorder, which proceeded, as is supposed, from a plethora, and the want of proper exercise. He was author of the following dramatic pieces, viz. "Ambitious Vengeance;" "Lorenzo;" "The Magician or Conjuror;" and "Fenelon," a serious drama. Monthly Magazine, Jan 1799.

MERRY'S Island, in *Geography*, an island in Hudson's Bay. N. lat. $61^{\circ} 52'$. W. long. $93^{\circ} 5'$.

MERRY-MEETING BAY, a bay of America, in Strafford county, New Hampshire, being the southernmost arm of lake Winnipisaukee. On its W. side stands Mount Major. —Also, a bay in Maine, formed by the junction of Androscoggin and Kennebeck rivers, opposite to the town of Woolwich, 20 miles from the sea.

MERS AGOLETA, a town of Algiers, near the sea-coast; six miles S.W. of Tneifs.

MERS il Kecer. See MAZALQUIVIR.

MERSA, EL, a town of Africa; 12 miles N.E. of Tunis.

MERSBURG, or **MORSBURG**, a town of the duchy of Baden, seated on the lake of Constance, containing a seminary for secular clergy, and a nunnery of the Dominicans; six miles N.E. of Constance. N. lat. $47^{\circ} 41'$. E. long. $9^{\circ} 14'$.

MERSCH, a town of France, in the department of the Forests, and chief place of a canton, in the district of Luxembourg. The place contains 1446, and the canton 8185 inhabitants, on a territory of $217\frac{1}{2}$ kilometres, in 15 communes.

MERSCHOWITZ, a town of Bohemia, in the circle of Leitmeritz; 14 miles W.S.W. of Leitmeritz.

MERSEA, a township of Upper Canada, in the county of Essex, seated on lake Erie, W. of Romney.

MERSEBURG, a principality of Saxony, encompassed by the circles of Leipsic and Thuringia, the principality of Querfurt, and duchy of Magdeburg. The soil is fertile, and well cultivated, producing wheat, millet, and flax, but wanting wood.—Also, the capital of the above-named principality, seated on the Saale. It contains within the liberties of the Chapter, the episcopal palace and cathedral; a gymnasium or foundation school, the chancery-house, the chapter-house, the curia or residences of the canons, and other buildings. It has also a parish church; and derives its chief subsistence from the strong beer that is brewed here and exported to different places; 16 miles W. of Leipsic. N. lat. $51^{\circ} 22'$. E. long. $14^{\circ} 6'$.

MERSENETI, a town of Asiatic Turkey, in Natolia; 10 miles S.E. of Milets.

MERSENNE, MARIN, in *Biography*, a learned French mathematician and philosopher, was born at Oyse, in the province of Maine, in the year 1588. He pursued his college studies at La Fleche, where he had as a fellow student the celebrated Des Cartes, with whom he contracted an intimacy and friendship that lasted during their lives. Here Mersenne rendered himself conspicuous for the diligence and rapid progress which he made in his various studies. From La Fleche he went to the university of Paris, where he paid

the

MERSENNE.

the utmost attention to the mathematical sciences; after which, he went through a theological course at the Sorbonne. When he had completed his studies, he entered himself at the convent of Minims near Paris, and took the vows in 1612, when he was only 24 years of age. In the following year he was ordained priest, and began to study the Hebrew language, of which he made himself a complete master. In 1615 he was sent to the convent of his order near Nevers, to fill the philosophical chair in that house; and he continued there, teaching philosophy, and afterwards theology, till the year 1619, when he was chosen superior of the convent. Upon the expiration of the term of his office, which was annual, he withdrew to Paris, where he spent the remainder of his life in study and literary converse, excepting such time as he devoted to short excursions into Italy, Germany, and the Netherlands. While at this great city, he was the chief friend and literary agent of Des Cartes, giving him advice and assistance upon all occasions, and informing him of every thing of a literary and philosophical kind that was going on in that city, and elsewhere. So highly did Des Cartes estimate the opinion of our philosopher, that he scarcely did any thing, without first consulting his friend. It has been reported, that when Des Cartes was about to found his system of philosophy upon the principle of a vacuum, he was informed by Mersenne, who had founded the Parisian philosophers upon it, that it would not be admitted, and immediately changed his system, and adopted the opposite doctrine of a plenum. Mersenne was much celebrated for possessing the peculiar talent of forming curious questions and problems; some of which, it afterwards appeared, he was unable to solve. To him has been ascribed the invention of the curve, well known by the name of the "cycloid," which instantly engaged the attention of mathematicians. Schooten, indeed, ascribes the invention to Des Cartes; but Torricelli, in the appendix, "De Dimensione Cycloidis," says, the curve was discovered and named by Galileo and others, about the year 1599, before Mersenne and Des Cartes could have made much progress in mathematical learning. Dr. Wallis, in the first volume of the London "Philosophical Transactions abridged," attempts to shew that it is a much older invention, and was known to Bovilli in the year 1500, and by cardinal Cusa a full half century before this. Mersenne died in the year 1648. The loss of him was deeply regretted by persons of all ranks who were acquainted with him, by whom he was as much beloved for the cheerful qualities of his heart, and his mild and amiable temper, as he was respected for his profound scientific knowledge. He was, while a resident at Paris, the very centre of communication between literary men of all countries; being there, what Mr. Collins was in England. He omitted no opportunity of engaging them to publish their works; and to Mersenne the world is indebted for several important discoveries, which would probably have been lost, but for his encouragement and patronage. His own works were numerous, and many of them highly important. The first which he published, of any magnitude, was entitled "Questiones celeberrimæ in Genesim, &c. cum accurata Textus Expheatione. In hoc Volumine Athei et Deilæ impugnantur et expugnantur." The other works of this philosopher are enumerated in the General Biography, to which our readers are referred.

In the musical writings of this diligent and ingenious ecclesiastic may be found the most minute and satisfactory account of the state of music in France, during the reign of Louis XIII., particularly in his "Harmonie Universelle," published at Paris in 1636, in folio; a work in which, through all the partiality to his country, want of taste, and

method, there are so many curious researches and ingenious and philosophical experiments, which have been of the greatest use to subsequent writers, particularly Kircher, as render the book extremely valuable. This work, corrected and enlarged, was translated into Latin, and published by the author in 1648, the year of his death, under the following title, "De Sonorum Natura, Causis et Effectibus." In his twenty-third proposition, liv. i., this author explains and describes twelve different kinds of music and movement, used in France during his time: these were motets, songs or airs, passacailles, pavans, allemandes, gaillards, voltes, courantes, farabandes, canaries, branles, and balets; of all which he gives examples in notes. But though most of these movements were the specific names of the dances then in vogue, the minuet, which, during the present century, has been in such general favour all over Europe, is never mentioned.

In the "Pref. generale," Mersenne speaks of Galileo's discoveries in harmonics; and in his liv. ii. "Des Consonances," of sympathetic vibrations. In other parts of his work he explains clearly the twelve keys major of practical music; and shews, for the first time perhaps, that there may be seventy-two keys, or six for each note, flat, natural, and sharp, major and minor. There is nothing in this good father's book which reflects more honour on his taste and penetration than his partiality for the violin, to which, in liv. iv. "Des Instrumens," prop. i. he gives the preference over all other instruments then in use, at a time when it was thought unworthy of being admitted into the concerts of other countries.

It is amusing, however, to see how contented mankind have ever been, in the most rude and uncultivated ages of the world, with their own talents and accomplishments. A singular instance of this mental comfort appears in Mersenne, chap. "De l'Embellissement des Chants," which he addresses "to posterity, that they may form some idea," says he, "of our manner of gracing and embellishing airs; as such advances have at no time been made in polishing and refining melody, as at present." In his treatise "De la Voix," where he explains the manner of running divisions and making shakes, he says, that "of all nations who study singing, and who run divisions in the throat, the French execute passages in the neatest manner: this even the Italians confess, who make a particular profession of singing. It is impossible," adds he, "to describe the beauty and sweetness of our vocal embellishments to such as have not heard them; for the purring of a stream, the meandering of a brook, or the warbling of a nightingale, is not half so mellifluous. And I find nothing in nature," continues this pious father, "that can give the least idea of these passages, which are far more ravishing than shakes or trills, for they are the very quintessence of music." (Liv. i. De la Voix, p. 40.) He afterwards observes, that no traces are to be found in the writers of music among the ancient Greeks, that this ingenious and voluptuous people ever had "des fredons & des passages comme nous autres:" trills and divisions in their music, like us.

One proposition in this book (xxxiv.) is to inquire whether the French method of singing is the best of all possible methods? and determines in the affirmative, not only with respect to this proposition, but affirms that of all those he had heard sing in neighbouring countries, as in Spain, Germany, Flanders, and Italy, he had met with none who sung so agreeably as the French. "There may," says he, "be now and then a miraculous performer in other countries, but I speak here in general."

He mentions recitative as a thing little practised in France,
for

for want of courage. The Italians, he observes, had succeeded in this species of singing, which Giacomo Peri had invented at Florence the beginning of the century. Here he speaks of several musical dramas in Italy, but does not call them operas. (Liv. vi. L'Art de bien Chanter.) A book with the same title was published at Paris, by Bacilly, 1668.

The *fi*, to express the seventh of the key, does not seem to have been in use at this time in France; as Merfennus in his solmifation has never introduced it, repeating the *mi*, in the key of C, for E and B.

MERSEY, in *Geography*, a navigable river of England, flows from the east to the west, and forms, in the greater part of its course, a natural boundary between the counties of Lancaller and Chester. Its whole extent is about fifty miles; thirty-five of which are navigable, from Liverpool to the mouth of the river Irwell, for vessels of considerable burthen. The Mersey derives its origin from the junction of the rivers Etherow and Goyt, where it assumes the present name, and in its course receives the streams of the Tame, the Bullen, the Irwell, and the Weever. Opposite Warington in Lancashire, where it meets the tide-water, the Mersey is only forty yards wide; but at Runcorn-gap, where it communicates with the Grand-trunk, and duke of Bridgewater's canals, its width is three hundred yards: below the gap, it extends itself into a grand estuary of three miles in width, and receives the navigable river Weever from Northwich and Frodham. In its course northward from Runcorn, it gradually diminishes for six miles, and opposite Liverpool is only three-quarters of a mile wide; but it forms a fine channel, at least ten fathoms deep at low water, and is very commodious for shipping. About five miles farther, measuring by the Cheshire coast, it falls into the Irish sea, by two or three different channels, which are much incommoded by sands; but the passage is rendered secure by means of various land-marks, buoys, and light-houses, and the excellent system of pilotage established by the Liverpool merchants. Lysons's *Magna Britannia*, vol. ii.

MERSIG, a town of France, in the department of the Sarre, and chief place of a canton, in the district of Sarrebruck. The place contains 1832, and the canton 6421 inhabitants, in 20 communes.

MERTAQUE, a town of New Spain, in the province of Honduras, which produces cochineal.

MERTENSIA, in *Botany*, a genus of the Submersed *Algae*, commonly termed Sea-weeds, named by the celebrated Thunberg, in honour of Professor F. C. Mertens, of Bremen, a man of the most amiable character, highly distinguished by his knowledge of this tribe of vegetables in particular. A treatise illustrating this genus was published by Dr. Roth, in Schrader's *New Journal* for 1807. A *Mertensia* had indeed previously appeared, from the pen of Professor Willdenow, in the *Stockholm Transactions* for 1804, belonging to the order of Ferns; but that being reduced to another genus, (see *GLEICHENIA*), the present is established; and as far as any opinion can be formed of so unsettled a tribe, it seems to be tolerably distinct from all that have already been adopted. Roth, in *Schrad. New Journ.* v. 2. fasc. i. 11. t. 1. f. B.—Class and order, *Cryptogamia Algae*. Nat. Ord. *Algae*, Linn. Jussl.

Ess. Ch. Frond internally jointed. Seeds dispersed in the coats of cluttered inflated vesicles.

1. *M. lumbriculis*. Roth as above. (*Ulva lumbricalis*; Linn. *Mant.* 311. *Syst. Veg.* ed. 14. 972. Thunb. *Prod.* 180.) Gathered by Koenig, as well as by Thunberg, upon submarine rocks at the Cape of Good Hope. The root consists of many slender entangled fibres, attaching themselves

to shells and stones. *Fronds* several, three or four inches high, cylindrical, blackish, tapering at the base, determinately branched, the thickness of a crow's quill, or more, greenish-yellow, or purplish, composed of a thickish coriaceous coat; internally spongy, and interrupted by very frequent transverse reticulated partitions, which are scarcely discoverable at the outside. *Fructification* generally axillary, rarely lateral, consisting of numerous crowded, obovate, or oblong, vesicles, proceeding from a slightly elevated fleshy base, or *receptacle*. Each of these is jointed internally like the frond, but their coat is rather thinner and more pellucid, bulging very numerous, scattered, roundish-oval, crystalline *seeds*. The specimens in the herbarium of Linnæus justify his description of the fructification being terminal, but Roth asserts that it becomes so only by accidental injuries to the frond. The internal partitions are considered by this great cryptogamist of a spurious nature, as originating from cellular substance only, which dilates into a transverse web or net. The *seeds* are dispersed under the external cuticle, exactly as in real *Ulva*, though confined to the above-mentioned vesicular excrescences, which however seem materially different from branches, nor do they appear ever to be extended into such.

MERTHYR TYDVIL, or *Tudfyl*, in *Geography*, a large and populous market-town, situated in the cwmwd of Senghennydd, cantref of Brehinol, now the hundred of Caerphilly, and county of Glamorgan, South Wales. It is a place of great antiquity, and is said to derive its name from Tydvil, the daughter of Brechan, prince of Brecknockshire, who was murdered here, along with her father and brother, Rhun Dremrudd, by a party of Saxon marauders, about the close of the fifth century. Tydvil was the wife of Cyngin, son of Cadell, prince of the vale royal and part of Powys, and is reckoned among the number of the ancient British saints. After her death, the Saxons having been expelled by the prowess of her nephew, Nevydd, a church was erected and dedicated to her at this place, and called the church of Merthyr Tydvil, which in Welsh signifies "the Martyr Tydvil."

From this period, nothing occurs deserving of notice relative to Merthyr Tydvil, till about the year 1620, when it was distinguished for its zeal in the cause of non-conformity. Though then trivial in extent and political importance, it was nevertheless a sort of hot-bed, which contributed in no small degree to engender and keep alive, for more than a century, those religious dissensions, the effects of which still continue visible in the separation of the greater proportion of the inhabitants of Wales from the established church. In 1755 a new era commenced in the history of this place. The extensive and valuable mines in its immediate vicinity had hitherto attracted but little notice. At this time, however, Mr. Bacon particularly directed his attention towards them; and having obtained a lease of a district, extending about eight miles in length, and four in breadth, at the moderate rent of 200*l.* per annum, immediately began operations, and erected extensive works for the smelting and forging of iron. This gentleman continued increasing his establishment till the year 1783, when he deemed it proper to let out the greater part of his property to Mr. Crawshay, and the remainder to Mr. Hill: at the same time, he reserved to himself a certain tonnage on all the iron manufactured above a specified quantity. The new proprietors soon augmented the works; and the part belonging to Mr. Crawshay, at Cyfartha, are now by far the largest in this kingdom, and probably in Europe. He employs no fewer than 1500 men, at an average of 30 shillings a week per man. The weekly wages paid for labour amount to 1500 pounds.

The.

The average of iron produced from these works is from 180 to 200 tons a week. Six furnaces and two rolling-mills are employed. For procuring blast for the furnaces and working the mills, there are four steam-engines; one of fifty, one of forty, one of twelve, and one of seven horse power. The first engine is connected with the four upper blast-furnaces, to which is a water-engine annexed of nearly the same power. The machinery of this establishment is truly gigantic; and that part of it worked by water is curious, and certainly highly powerful. The great water-wheel is a most extraordinary piece of mechanism: it was constructed under the superintendance of Watkin George, and measures 50 feet in diameter. W. George was then a carpenter employed about the works: he was afterwards taken into partnership, and received 20,000*l.* to give up his share. Besides these works, and those of Mr. Hill, there are two others at Pendarren and Dowlais; the former producing about 140 tons of iron weekly, and the latter about three fourth-parts of that quantity. The total number of smelting-furnaces near this town is seventeen, *viz.* Dowlais four, Pendarren three, Plymouth (Mr. Hill) four, and Cyfartha six.

No fact can better illustrate the magic influence of trade on the condition of a country, than the rapid change which has been effected at Merthyr Tydvil and its neighbourhood. Forty years ago, this town was an inconsiderable village, and contained only a few hundred inhabitants; whereas, by the sole operation of its iron-works, it has risen to be by far the largest and most populous town in Wales. The inhabitants of this parish were estimated at 7705, in 1801; but the population is conjectured to amount to 10,000 persons. In 1803 the money raised for the poor rates, at 6*s.* 6*d.* in the pound, was 1453*l.* 17*s.* 10½*d.* The streets in general are close and confined, and have no proper outlets behind the houses. Considerable improvements, however, have already been made within these last five or six years. Such streets as have been built since that period are much better arranged, and wider than those which were erected earlier. At Pendarren is a large and elegant house, surrounded by beautiful gardens and pleasure-grounds, belonging to Mr. Homfray. The parish church, rebuilt in 1806, is a large and handsome building; and besides it, there is a spacious chapel built by Mr. Crawshaw. The meeting-houses for dissenters of different sects are about eleven in number: three Baptists, two Presbyterian, two Independents, two in the Wesley connection, and two in that of Whitfield. A theatre has been lately erected here. There is likewise a philosophical society here, as well as a printing-house, and a book-seller. The inhabitants of this town are chiefly Welsh, and the language spoken in it almost entirely so. Less immorality prevails than might be expected in a place where the population consists chiefly of the lower orders. This is partly owing to the circumstance of the iron-masters and clergymen being usually magistrates for the county, and partly to the effect of religious instruction. These magistrates have the power of nominating the requisite number of constables, and must submit all their proceedings to the quarter and great sessions. A court of conscience, for the recovery of small debts, has been instituted here by act of parliament, within these three years. This town has three market-places, which are well supplied twice every week, on Wednesdays and Saturdays. It has likewise several fairs during the year. The weighty and valuable productions of Merthyr Tydvil find an easy conveyance to the sea, by means of a canal which extends hence to Penarth harbour, in the Bristol channel, being navigable as far as Cardiff for vessels of 300 tons, and above that town for barges of 100 tons. This canal, begun about 22 years ago, was completed in 1798.

At the Cyfartha works, where it terminates, it is 568 feet above the level of the sea; which elevation is effected by means of about 40 locks. A new tram road runs nearly by its side, through its whole course, extending altogether 26 miles in length.

Besides its iron ores, the neighbourhood of this town is abundantly productive of other minerals useful in the arts, and consequently subservient to the convenience and happiness of man. Coal, so indispensably necessary in the manufacture of the iron, is supplied in immense quantities, and of excellent quality. Good mill-stones and stones for paving are likewise abundant; and in the lime-stone rocks are found beds of black and variegated marble, not inferior to any in the kingdom.

About two miles from the town, on the summit of a lofty mountain, is situated a very ancient market-place, where weekly markets have now been held for upwards of 800 years, during the summer season, from the 14th of May till the 14th October. This singular market is still much frequented. Several fairs are likewise held here for cattle, though the houses in the place do not exceed six in number.

Morlais castle stands about three miles to the north-west. It is situated on the summit of a hill, about half a mile from the ancient road over the mountains from Cardiff to Brecknock, overlooking a ravine of great depth, in the bottom of which runs a branch of Taff Vechan river. The area of this castle forms an irregular pentagon, defended on the south and east sides by a very large and deep trench cut in the solid rock. On the north and west sides it is rendered sufficiently strong, by the bold and rugged precipices which overhang the dingle. The whole of this castle is now in ruins. It was built by Ivor Petit, or Ivor Bach, the son of Cedevor, who was no less distinguished for his valour than for the uncommon smallness of his stature. Malkin's Scenery, Antiquities, and Biography of South Wales, 2 vols. 8vo. 1807. Carlisle's Topographical Dictionary of Wales, 1 vol. 4to. 1811.

MERTOLA, a town of Portugal, in Alentejo, seated on the Guadiana, containing about 2400 inhabitants; 24 miles S.S.E. of Beja. N. lat. 37° 36'. W. long. 7° 37'.

MERTON, a village in the west half-hundred of Brixton, in the county of Surrey, England, is situated on the Epsom road, nine miles distant from London. It contained in the year 1801, according to the return then made to parliament, 151 houses, occupied by 813 persons. The manor, which before the Conquest was the property of earl Harold, and was afterwards held by the crown, was granted by Henry I. to Gilbert Norman, sheriff of Surrey, who, in the year 1115, built a convent for canons regular of the order of St. Austin. The establishment was patronised by the king and his queen Matilda. In 1130, Merton abbey, as it was then called, was built with stone; and in 1136 the canons entered on the possession of it. The benefactions to it were numerous and ample. In the year 1236 a parliament was held at the abbey, wherein were enacted the statutes which take their name from that place. In this house also was concluded the peace between Henry III. and the dauphin of France. The abbey was surrendered in 1538; and the site was afterwards granted to the newly-established monastery at Shene. After the dissolution, it was leased out to private persons; and during the civil war of Charles I. it appears to have been used as a garrison. At present there is no other vestige of the abbey than the east window of a chapel of crumbling stone, which seems, from its style, to have been built in the fifteenth century. The walls which surround the premises, including a space of about 60 acres,

are nearly entire. The site has long been occupied by two extensive manufactories for printing calicoes; and a copper mill is also established here.

The parish church of Merton was built, early in the twelfth century, by Gilbert Norman, the founder of the abbey. It is constructed of flints, and consists of a nave and chancel; and at the west end is a low spire. From the style of architecture, it is presumed to be the original structure, which has undergone but little alteration. In the chancel window are some remains of painted glass; and against the north wall of the church is a large picture of Christ bearing the cross.

Merton-Place, the seat of the late admiral Nelson, is in this parish; as is Cannon-hill, the villa of William Mollison, esq. Sir Richard Hotham had a seat here, which was purchased by — Graves, esq. Lysons's *Environ's of London*, vol. i.

MERTVOI KULTUCK, a bay at the north extremity of the Caspian sea. N. lat. 46°.

MERTZA, a small island in the north part of the gulf of Bothnia. N. lat. 65° 27'. E. long. 22° 9'.

MERTZBACH, a town of the duchy of Wurzburg; 6 miles N.N.E. of Ebern.

MERU, a town of France, in the department of the Oise, and chief place of a canton, in the district of Beauvais; 12 miles S.S.E. of Beauvais. The place contains 1800. and the canton 7131 inhabitants, on a territory of 165 kilometres, in 20 communes.

MERU, a very celebrated mountain, in the mythological fables of the Hindoos. The word in Sanscrit signifies an *axis*, or *centre*; and hence, perhaps, it has been applied to the north pole, which, being deemed the most elevated region, led the poets to describe Meru as the highest mountain in the world. It is also, by way of pre-eminence, called *Sū-merū*, denoting its fairness or beauty. In the 15th chapter of the first book of the Mahabarat, it is thus described: "There is a fair and stately mountain, and its name is *Mēroo*; a most exalted mass of glory, reflecting the sunny rays from the splendid surface of its gilded horns. It is clothed in gold, and is the respected haunt of deus and gandharvas (deities and celestial choristers). It is inconceivable, and not to be encompassed by sinful man; and it is guarded by dreadful serpents. Many celestial medicinal plants adorn its sides; and it stands, piercing the heavens with its aspiring summit, a mighty hill, inaccessible even by the human mind. It is adorned with trees and pleasant streams, and resoundeth with the delightful songs of various birds." (Gita, p. 146.) The above is the introduction to the story of the Kurmavata, given by the learned translator in a note on the Gita. (See *KURMAVATARA* and *BRACHMANS*.) This may be deemed sufficiently extravagant; but it is tame, compared with some of the ravings of Hindoo mystics, who find, in the contemplation of this mysterious mountain, types and symbols of every thing in and out of nature. Here follows a specimen of the *Brahmanda Purana*, taken from Mr. Wilford's dissertation on the Sacred Isles in the West, in vol. viii. of the Asiatic Researches. "Meru is the sacred and primeval *Linga*, and the earth beneath is the mysterious *Yoni*, open like the *Padma* or *Lotos*. The convexity in the centre is the *Os tinea*, or navel of *Vishnu*; and the Hindoos often represent the physiological mysteries of their religion by the emblem of the *Lotos*, where the whole flower signifies both the earth and the two principles of fecundation; the germ is both *Meru* and the *Linga*; the petal and filaments are the mountains which encircle *Meru*, and are also the type of the *Yoni*; the four leaves of the calyx are the four vast regions towards the

cardinal points; and the leaves of the plant are the different islands in the ocean round *Jambu*." At the end of this ingenious essay are curious plates, representing *Meru* under the fanciful semblance of a *lotos*, and other geographical extravaganzas of the Hindoo Puranas, or poetical fables. "Brahma, Indra, and all the gods, declare that 'his largest of mountains is a form consisting of jewels of unnumbered colours; the abode of various tribes; like gold; like the dawning morn, resplendent, with a thousand petals; like a thousand water-pots, with a thousand leaves. Within it is adorned with the self-moving cars of the gods, all beautiful; in its petals are the abodes of the gods, like heaven; in its thousand petals they dwell with their consorts. There resides above *Brahma*, god of gods, with four faces. There in the east is *Indra*, for ever to be praised; the lord of wealth, with a thousand eyes, the destroyer of towns.'" (See *INDRA*.) On this *Olympia* of the Hindoos are all the gods assembled in their magnificent palaces, under different designations. *Kailasa* is the paradise of *Siva*. (See *KAILASA*.) *Meru* is the grand-father of the river *Ganges*, as noticed under *MERA*, the name of his daughter. Under the articles *LINGA*, *LOTOS*, and *YONI*, some mention is made of this wonderful mountain; and the reader, desirous of farther accounts of it, and of mysticisms connected with it, is referred to vol. viii. of the Asiatic Researches, and to *Moor's Hindoo Pantheon*.

MERVILLE, MICHAEL GUYOT DE, in *Biography*, a French writer, was born at Versailles in 1696. After travelling through various countries, he settled as a bookseller at the Hague, where he published a literary journal. His affairs becoming embarrassed, he went to Switzerland, and drowned himself in the lake of Geneva in 1765. He wrote, 1. *Voyage Historique*, 2 vols. 12mo. 2. *Several Comedies*, &c. published at Paris, in 3 vols. 12mo.

MERVILLE, in *Geography*, a town of France, in the department of the North, and chief place of a canton, in the district of Hazebrouck; 15 miles W. of Lille. The place contains 5302. and the canton 16,608 inhabitants, on a territory of 60 kilometres, in 5 communes.

MERUIT QUANTUM, in *Law*. See *QUANTUM*.

MERULA, GEORGE, in *Biography*, a critic and historian, one of the revivers of ancient literature, was a native of Alessandria in Italy. He acquired the rudiments of Latin and Greek under able preceptors, was soon distinguished for his classical attainments, and passed the greatest part of his life in teaching the languages and rhetoric at Venice, Milan, and Pavia. He died at Milan, at an advanced age, in 1494. He was celebrated as an original writer, and as an editor and commentator. Under the patronage of Lewis Sforza he wrote "*Antiquitates Vicecomitum, five de Gestis ducum Mediolanensium*," of which the first decade was published in his life time, and four books of the second decade were given in the 25th vol. of the "*Scriptores Rerum Ital.*" He also composed a description of *Montferrat*, and of the eruption of mount *Vesuvius*, and a small historical tract entitled "*Bellum Scodrense*," descriptive of the siege of *Scutari* by the Turks in 1474. He was the first who gave an edition of the four Latin writers on agriculture, *viz.* *Cato*, *Varro*, *Columella*, and *Palladius*, with notes, 1472. In the same year he gave the first edition of the "*Comedies of Plautus*." He likewise either first published or illustrated "*Juvenal*;" "*Martial*;" "*Ausonius*," and the "*Declamations*" of *Quintilian*. He translated from the Greek, the lives of *Trajan*, *Nerva*, and *Adrian*. To him the world is indebted for the discovery of many ancient MSS. in the monastery of *Bobbio* in 1494. *Gen. Biog.*

MERULA, PAUL, was born at Dordrecht, in Holland, in

the year 1558. He acquired in his own country a profound knowledge of law, history, and polite literature, and then travelled for improvement into France, Italy, Germany, and England. On his return he was appointed to succeed the famous Lipsius as professor of history at Leyden, an office which he held for fifteen years. He died in 1607; leaving behind him several learned works, as "The Fragments of Ennius, with a Commentary;" "Eutropius;" "The Lives of Erasmus and Junius;" "Cosmographia," a work on ancient geography: "A Treatise on Law;" "A Treatise on Hunting, with the Laws respecting it;" the two last are in the Dutch language. After his death his works were collected and published under the title of "P. Merulæ Opera varia posthuma," 1684.

MERULA, CLAUDIO, DA CORREGGIO, (a small town in the state of Modena,) organist of the church of St. Marc at Venice in the time of Zarlino, and one of the interlocutors in the "Ragionamento primo" of his "Dimost. Harm." where he is called "il gentilissimo M. Claudio Merula, suavissimo organista del suo tempo"—the sweetest organist of his time. He had been maestro di cappella to the duke of Parma, and published "Toccate," or preludes for the organ, engraved on copper plates. The first book of his "Cantionum sacrarum" appeared at Venice in 1578, in 4to.; after this he published masses, psalms, motets, magnificats, madrigals in three, four, and five parts.

Claudio Merula was one of the first who attempted dramatic music. In 1574, he composed a theatrical piece at Venice, which was performed in the grand council chamber, for the entertainment of Henry III. of France, when he returned from Poland on the death of his brother, Charles IX. This piece was called a tragedy, and was probably declaimed, with madrigals and chorusses intermixed.

MERULA, TARQUINIO, *il Cavalier*, a whimsical composer of Bergamo; in the tenth vol. of whose works, printed at Venice in 1655, most of his instrumental movements are composed on a ground-bass, which soon after became a common practice with Stradella, Purcell, and others. This master was a church composer, and a madrigalists; but his favourite style seems to have been the burlesque: in his cantata of Curtius for a bass voice, published in 1638, the poet, after advising Curtius against so rash a step, tells him, that though he may easily find his way to the bottom of the gulph into which he was about to plunge, yet, he adds, *quanto al ritornare, sarà un difficile passo*; to which last word a division of six bars, of sixteen semiquavers in each, is given, in the course of which, the finger is carried from D on the sixth space in the bass, down to the abyss of double C. There is another division of seven bars at the last close, in which the passages are echoed, piano, and the trill of the times in iterations of the same note, in semiquavers, is written twice at full length.

The cavalier Merula's compositions are almost all so tintured with caprice and buffoonery, as to render them more singular and new at least than those of his contemporaries. In his "Libro secondo della Musiche concertate," published in 1635, he has published a three-part song, with ritornels for two violins and a bass, sopra la ciaccona, with his cantata of "Curzio precipitato." Among other capricious things in this publication, there is a Canzonetta spirituale sopra la Nanna, or Lullaby, consisting of only these two notes in the bass:



He has composed a learned fugue in four parts, on the declension of *Hic, hæc, hoc*; and another upon *Quis vel qui*:

nominativo qui, quæ, quod, &c. This last consists of several movements which are supported with vivacity, and imitations of the cant and flammering of school-boys in repeating their grammatical lesson. The single vocal airs of this period by Merula and others, which we have examined, in order to trace the progress of Italian melody, *ab ovo*, are dull, monotonous, and inelegant. Imagination, as yet, was too much fettered by canto fermo, canon, fugue, and ecclesiastical modes, to attempt the use of her wings.

MERULA, in *Ichthyology*, a species of *Labrus*; which see.

MERULA *Fluviatilis*, a name given by Schoneveldt, and some other writers, to the common tench. See CYPRINUS *Tinca*.

MERULA, in *Ornithology*, the *Black-bird*, a species of *Turdus*, of which there are several varieties. See TURDUS *Merula*, &c. For other species of *Merula*, see ALAUDA, CORVUS, GRACULA, LANIUS, MUSCICAPA, ORIOLUS, PARADISEA, STURNUS, and TANAGRA.

MERULA *Aquatica*, the name of a bird called the *water-ouzel* in English. See STURNUS *Cinclus*.

MERULA *Saxatilis*. See TURDUS *Saxatilis*, LANIUS *Infustus*, and CORVUS *Caryocatactes*.

MERULIUS, in *Botany*, a name of far-fetched etymology and meaning; adopted by Haller, for the genus which now retains it, from John Baubin, who in his *Historia* v. 3. 807, mentions some fungi as called by the name of *Merulius* or *Metulius*, from *Meta*, a pillar or boundary-post with a round top, which their shape resembles. Such fungi, no doubt, are numerous, belonging to various genera; but the idea is less suitable to our present *Merulii*, than to most others.—Hall. Hist. v. 3. 150. Perf. Syn. 488. (Cantherellus; Juss. 4. Lamarck Illust. t. 883.)—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Cap fleshy or membranous. Receptacle veiny, with superficial swelling plaits.

Perfoon defines 25 species of this very well-marked genus, whose fructifying membrane resembles the gills of an *Agaricus* in appearance only, being totally distinct in nature. Its surface is perfectly continuous, but pinched up, as it were, into simple or branched tumid plaits.—The genus is divided into three sections; 1st, the true *Cantherelli*, which have an entire, rather cup-shaped cap, with or without stalk, and consist of 20 species; 2d, *Serpula*, four species, which spread indeterminately, fructifying on the upper side, and have no stalk; 3d, *Gomphus*, one species, of a club-like but truncated shape, which we think might be referred to the first section.

Examples of the first section are,

M. *Cantharellus*. Common Chanterelle. Perf. n. 1. (M. n. 2326; Hall. Hist. v. 3. 150. Agaricus Cantharellus; Linn. Sp. Pl. 1639. Hudf. 609. Fl. Dan. t. 264. Bull. t. 505. f. 1. Sowerb. t. 46. Bolt. t. 62. A. n. 73; Schæff. t. 82, and n. 95. t. 206. Fungus angulosus, et velut in laciniis dissectus; Vaill. Paris. 60. t. 11. f. 14, 15.)—Clustered, deep yellow all over. Cap fleshy, smooth, depressed.—Very frequent in fir woods. It varies in the breadth of its top, from one to near three inches, and is entirely of the colour of yolk of egg, with an agreeable scent like a plum or apricot, especially when drying. This fungus is eaten in many countries, and seems to be no otherwise unwholesome, than as its toughness renders it indigestible. Haller reports the flavour to be excellent, though somewhat acrid, and says he had often eaten this *Merulius* dressed in meat broth, without any bad effects.

M. *nigripes*. Black-stalked Chanterelle. Perf. n. 3. (Agaricus cantharelloides; Bull. t. 505. f. 2.)—Cap funnel-shaped, yellowish. Stalk elongated, black, and footy.

—Native of France. Perfoon seems to have adopted it from Bulliard. The taller, more slender, black *stalk*, and more excavated top of the *cap*, seem the principal marks of distinction between this and the first species, of which Mr. Sowerby esteems it a variety only.

M. luteifera. Yellowish-stalked Chanterelle. Perf. n. 4. (Agaricus cantharelloides; Sowerb. t. 47. Helvella cantharelloides; Bull. t. 473. f. 3.)—Cap umbilicated, smooth; yellowish brown above; red lish ash-coloured beneath. Stalk yellow, hollow.—Not uncommon in woods in autumn, according to Perfoon, but it seems to have been first observed in England by Mr. Sowerby, Nov. 1794, in Peckham wood. This is clearly distinguished by its hollow pale-yellow *stalk*, and the reddish buff of its fructifying membrane, contrasted with the light brown of the upper surface.

M. cornucopioides. Cornucopiæ Chanterelle. Perf. n. 8. (Peziza cornucopioides; Linn. Sp. Pl. 1650. Sowerb. t. 74. Bull. t. 150. Bolt. t. 103. Elvela, n. 17. Schæff. t. 165, and n. 18. t. 166.)—Cluttered, blackish, trumpet-shaped, with a wavy reflexed margin; the upper surface scaly; fructifying membrane blueish, with obsolete plaits.—Common in woods in autumn. Distinguished by its invertedly conical trumpet-like shape, with scarcely any *stalk*, the central hollow of the *cap* running down the middle, almost to the root, so as to form a funnel, the outside of which is really the under side of the *cap*, and bears a blueish powder, presumed to be the seed. The plaits of this part are in general sufficiently obvious to mark the genus, though often evanescent. An essential difference exists between this fungus and *Peziza*, the latter producing its seeds from the strongly-coloured upper side of the *cap*, or cup.

M. retirugus. Reticulated Sessile Chanterelle. Perf. n. 16. (Helvella retiruga; Bull. t. 498. f. 1.)—Sessile, vertical, roundish, thin and membranous; smooth and pale grey above; ash-coloured, with radiating reticulated plaits beneath.—This pretty species was found in France by Richard, growing parasitically upon mosses and other plants, affixed by its smooth upper side. The margin is entire when young, but subsequently torn or lobed. The *stalk* is wanting in this, and two or three others of the first section, and Perfoon seems doubtful whether they ought not to range in the next. Their membranous nature, and determinate form, with the presence of a proper upper surface, surely justify their remaining where he has placed them.

The second section (which is Perfoon's third, as he divides the former into two, because some have a central stalk, and others a lateral one, or none at all) comprises four species, whose shape is quite indeterminate, the whole fungus being reversed, or laid on its back, without any stalk, and almost without any upper surface. The fructification is rare, or tardily produced. The most remarkable is

M. destruens. Dry-rot Merulius. Perf. n. 21. (Boletus lachrymans; Wulf. in Jacq. Misc. Austr. v. 2. 111. t. 8. f. 2. Dickf. Crypt. fasc. 1. 18. Sowerb. t. 113.)—Widely spreading, indeterminate, yellowish-red, with a white downy edge. Plaits widely reticulated. The nature of this formidable fungus has not been known till within a few years, though its effects have been but too notorious in countries where much fir wood is used for building. The plant insinuates itself in the form of a fine web, like a sort of mouldiness, amongst the timbers or wooden walls of a house, which it speedily and effectually destroys, so that in Sweden, where houses of fir are common, their unexpected downfall is by no means unfrequent. Mr. Sowerby informs us of this pest having lately attacked some ships in the British navy, concerning which he has been consulted by the navy commis-

sioners. The cure for this evil is the admission of air into all such structures, which is fatal to the growth of the plant. Where this vegetable thrives, it meets with a check to its increase by walls or otherwise, it thickens greatly, and produces a sort of orange-coloured honey-comb structure, containing the *seeds*, and discharging large drops of fluid here and there, as expressed in Mr. Sowerby's plate, justly commended by Perfoon.

M. vasinator, Perf. n. 22, seems very nearly akin to the last.

The third section consists of only one species,

M. clavatus. Club-shaped Chanterelle. Perf. n. 25. (Clavaria truncata; Schmid. Ic. t. 60.)—Club-shaped, abrupt, solid, with lateral plaits.—Found in grassy places in Germany, generally growing in tufts. The colour is violet, dull purple, or brownish. The shape is that of a *Clavaria*, either simple or branched; the top abrupt and flat, evidently, though narrow, analogous to the usual upper surface of the *cap* of a *Merulius*; the sides of the club-shaped body below being plaited or veiny, like the fructifying part of the other species.

MERY, JOHN, in *Biography*, a distinguished anatomist and surgeon, was born at Vavau, in Berry, where his father practised surgery, in January 1645. From his earliest years he displayed an exclusive attachment to the profession of his father, and at the age of eighteen went to the great hospital at Paris, the Hôtel Dieu, where he pursued the study with extraordinary ardour. So earnest, indeed, was he in this pursuit, that whenever he could procure a body, he conveyed it to his bed-room, and passed the night in dissection. In 1681 he was promoted to the office of queen's surgeon; and in 1683 he was appointed surgeon-major to the invalids, at the instance of M. de Louvois, who justly estimated his zeal and talents. In the following year, when the king of Portugal applied to Louis XIV. to send a surgeon to Lisbon to attend upon the queen, he was sent post to that capital; but the queen died before his arrival. Both the courts of Spain and Portugal attempted, by very advantageous offers, to induce him to remain in the peninsula, but he declined them, and returned to Paris. He was now, 1684, received into the Academy of Sciences; and he was soon afterwards sent on a journey to England, by order of the court; but the object of this mission was never made public. He was also chosen by the monarch to attend upon the duke of Burgundy, then a child. Attendance on a court, however, as Fontenelle remarks, was not less irksome to him at home, than in Spain or Portugal, and he returned as soon as it was in his power to the hospital of invalids, and to the dissecting room.

He lived in retirement from all society, as far as it was possible, shutting himself in his closet as soon as he had performed the ordinary duties of his office, which he transacted very methodically: he was not seen even by his family, except at his hours of repast; and declined all solicitations to engage in private practice, except for the service of a few friends. In 1700 he was appointed first surgeon to the Hôtel Dieu, which gratified his utmost ambition, and afforded him abundant opportunities of gratifying his zeal in the pursuit of knowledge, for which he voluntarily sacrificed all considerations of rank and emolument. His high reputation for anatomical knowledge brought many requests from foreigners to give lectures upon that subject; which, however, he declined. But he procured for the students of the Hôtel Dieu the erection of a theatre, in which they might obtain a regular course of anatomy, instead of the casual instructions which they had hitherto received; and he expected no additional

tional recompence for his increased trouble. It was a great part of the labour of his life to form an anatomical museum, which at length he rendered extremely curious and complete. For this purpose, he secluded himself in the most minute and patient dissections; and no man surpassed him in the accuracy with which he investigated facts relative to the construction of the human body. Nevertheless, he justly entertained a very humble opinion of the extent of information, which the knife of the anatomist can bring before the mind, in regard to the minute operations of the animal economy; and was accustomed to say ingenuously, "we anatomists are like the porters of Paris, who are well acquainted with all its streets, as well as its lanes and alleys, but know nothing of what passes within the houses." From the steady occupation of the investigation of facts, he was not in the habit of inventing theories, and did not readily admit the reasonings of others; at the same time, he did not easily renounce his own, when he thought them well founded on observation. Being little used, likewise, to the forms of polite conversation, he stated his views with great plainness, and used no ceremony in contradicting opinions and assertions, which he thought absurd or unfounded in fact; whence he sometimes gave offence at the meetings of the Academy without intending it. In his moral habits he was extremely regular, and always had a high sense of religion. He was married, and had several children. About the age of seventy-five, he suddenly lost the use of his legs, without any other indisposition; but from that time his health and strength began to be impaired, and he died in 1722, in his seventy-seventh year.

In addition to a great number of valuable communications, which were printed in the Memoirs of the Academy of Sciences, Mery published the following works separately. 1. "Description de l'Oreille de l'Homme," Paris, 1681, which was annexed to Laney's work "De l'Âme sensitive," by which he anticipated Duverney, who was known to have been long employed on the same subject. 2. "Observations sur la Manière de Tailler dans les deux Sexes, pour l'Extraction de la Pierre, pratiquée par Frère Jacques," *ibid.* 1700, 12mo. This is a very scientific and candid discussion of that celebrated empiric's method of cutting for the stone, the general principle of which he approves, while he points out many mischiefs in his operations, occasioned by his ignorance of anatomy, and the rudeness of his instruments. 3. "Nouveau Systeme de la Circulation du Sang, par le trou ovale, dans le Fœtus humain, avec les Reponses aux Objections de M. M. Duverney, Sauvry, Verheyen, Sylvestre, et Buissiere," *ibid.* 1700, 12mo. The controversy upon this question was carried on with ardour. Mery controverted the received opinion, that part of the blood passes from the right to the left ventricle, through the foramen ovale, and maintained that its passage was in the opposite direction; and, therefore, that the greater part of the blood in the fœtus circulated through the lungs, and the smaller portion through the rest of the body. It is singular, as Senac remarks, in his treatise on the heart, that Mery, who was in error, had the greater number of partizans; but Duverney and the rest defended the question ill. 4. His last work, "Problèmes de Physique," *ibid.* 1711, 4to., relates to the connection of the fœtus with the mother, and its nutrition, which he maintains, in opposition to Falconet, to be effected by means of the maternal blood alone, and not by any lacteous fluid, produced in the uterus for that purpose. Eloy Dict. Hist. de la Med. Fontenelle, *Eloges des Acad.* Gen. Biog.

MERY-*fur-Seine*, in *Geography*, a town of France, in the department of the Aube, and chief place of a canton, in

the district of Arcis-*sur-Aube*; 15 miles N.W. of Troyes. The place contains 1164, and the canton 9849 inhabitants, on a territory of 330 kilometres, in 26 communes. N. lat. 48° 30'. E. long. 3° 58'.

MERYTA, in *Botany*, from *μυρτα*, to collect in clusters, alluding to the situation of the flowers. Forst. Gen. t. 60. Just. 442. Lamarck Illustr. t. 803. Class and order, *Dinizia Triandria*. Nat. Ord. uncertain.

Gen. Ch. Male flowers aggregate in close heads. Cal. Perianth in three deep, ovate, acute segments. Cor. none. Stam. Filaments three, capillary, the length of the calyx; anthers oblong, with four furrows.

Female flowers not discovered.

1. *M. lanceolata*. Forst. Prod. 92.—Native of the Society isles.—The male flowers are represented in an hemispherical, lateral, sessile head. This is all the information extant respecting the genus in question; except that we find, by a note of the younger Linnæus, that sir J. Banks and Dr. Solander had likewise described it as new, by the name of *Nesfa*.

MERZAPOUR, in *Geography*, a town of Bengal; 15 miles N.N.W. of Moorshedabad.—Also, a town of Hindoostan, in the country of Benares, seated on the Ganges; 24 miles W.S.W. of Benares. N. lat. 25° 10'. E. long. 82° 50'.

MERZBERG, a town of Silesia, in the county of Glatz, which has a silver mine; 10 miles S. of Glatz.

MERZIFOUR, a town of Asiatic Turkey, in Natolia; 30 miles S. of Samfun.

MES, a river of Persia, which runs into the Tab, near Ragian.

MESA, CHRISTOVAL DE, in *Biography*, a Spanish poet, who lived five years in habits of intimacy with Tasso. He is the author of three heroic poems. 1. "Las Navas de Tolosa," 1598, upon the great victory won at Madrid by Alonzo VIII. over the Moors. 2. "La Restauracion de Espana," 1607, of which Pelayo is the hero. 3. "El Patron de Espana," 1612, in honour of Santiago. Besides these works he published some smaller pieces, as a tragedy upon Pompey, and a translation of the whole of Virgil; and he left in MS. a version of the Iliad. Gen. Biog.

MESA, in *Geography*, a river of Russia, which discharges itself in the Tazovskaia gulf, N. lat. 68° 12'. E. long. 79° 14'.

MESA, La, the southernmost of four isles in the Pacific ocean, near each other, and E. of the Sandwich isles. N. lat. 10°. W. long. 137° 10'.

MES-AIR, or MEZAIR, in the *Manege*, is a manege half *terra a terra*, and half *corvet*: so that the mezaire is higher than the action of the former, and lower than that of the latter. In this action use the same aids as in working upon curvets. Give the aids of the leg with delicacy, and no stronger than is just necessary to carry your horse forward. Remember when you close your legs to make him go forward, to push with the outward in such a degree as to keep your horse confined, and to assist the other in driving him forward; as it is not necessary to lay so much stress on the inner leg, because that serves only to guide the horse, and make him cover and embrace the ground that lies before him. Berengier's Horsemanship, vol. ii. p. 116.

MESANA, in *Geography*, a town of Hindoostan, in Guzerat; 35 miles N. of Amedabad.

MESANGE of Buffon, in *Ornithology*. See MOTACILLA and PARUS.

MESANGIA, the name of a bird common in France and Italy; it is of the size and shape of the *ficedula*,

and differs from it very little, except the having a black spot upon the head. This seems to be the *melancoryphos* of the ancients, who supposed, as many do at this time, that the scedula changed into this bird. The scedula, or fig-eater, comes into the gardens in France only at the time when the figs, which are its proper food, are ripe: these it devours in an insatiable manner, and, as soon as it has done with them, goes away again. Soon after this the *mesangia* or black-cap appears, and is supposed to be the same bird, with the addition of this beautiful ornament. The ancients were very fond of this imaginary change of one bird into another; and Aristotle tells us, that the upupa is the same bird with the cuckoo, only changed in the colour and disposition of its feathers. Æschylus tells us in the same manner, according to the opinion of his times, that the cuckoo sings all the summer, and after that disappears; and that soon afterwards it comes again in a new form, with a plume upon its head, and is called the *upupa*.

MESARAIC, in *Anatomy*, a term applied to the blood-vessels, glands, &c. of the mesentery.

MESAYEH, in *Geography*, a town of the Arabian Irak, on the Euphrates; 50 miles S.S.W. of Bagdad.

MESAZONTES, *μεσάζοντες*, officers under the emperors of Constantinople. See MEDIATOR.

MESCHEDIZAR, in *Geography*. See MEDSHETISAR.

MESCHETWIND, a town of Bavaria, in the principality of Bamberg; seven miles S.W. of Forcheim.

MESCHID, a town of the Arabian Irak, near a large lake called "Rahemat," which communicates by a canal with the Euphrates. This is the place in which Ali, Mahomet's cousin and friend, and one of his successors, is said to have been interred; and his tomb is annually visited by a multitude of Persian pilgrims, who deem it a part of devotion equal to the pilgrimage to Mecca; 90 miles S. of Bagdad. N. lat. $32^{\circ} 5'$. E. long. $43^{\circ} 34'$.

MESCHID-Huffain, a town of the Arabian Irak, situated on a canal which passes from the Euphrates to the lake Rahemat; 53 miles S.S.W. of Bagdad. N. lat. $32^{\circ} 36'$. E. long. $43^{\circ} 29'$.

MESCHID, or *Maschid*, a city of Persia, in the province of Khorasan. Abas I. raised this place, which was small and called "Tus," to eminence, by erecting a magnificent mosque in honour of an Imam who was buried there, and which drew together a great number of pilgrims. This town has a manufacture of beautiful pottery, and also a manufacture of skins. In time of peace caravans pass continually through this town from Bucharia, Balk, Candahar, Hindooftan, and all parts of Persia. N. lat. $37^{\circ} 35'$. E. long. $57'$.

MESCHIDABAD, a town of Asiatic Turkey, in Nalolia; 25 miles S.S.W. of Amafreh.

MESCHIQUEJOS, a town of South America, in the province of Carthagenia; ten miles S. of Mompox.

MESCINZUNGH, a town of Thibet; 30 miles W. of Tankia.

MESCOLANZA, Ital. mixture: as *mescolanza dell' antica e moderna*, a mixture of ancient and modern music.

MESE, in *Geography*, a small island in the East Indian sea. N. lat. $6^{\circ} 55'$. E. long. $131^{\circ} 50'$.

Mesé, in the *Ancient Greek Music*, the name of the most acute sound of the second tetrachord. It implies *mean*: as it was in the middle of the great system, and an octave above the *proslambanomenos*.

Euclid calls mese the found by which all other sounds are regulated. And Aristotle, in his 36th problem, sect. 19, says, that all the tones of a scale are accommodated or tuned to the mesé. See *MUSIC of the Ancients*.

MESLEMBRIA, or *Mesolium*, in *Geography*, a town of European Turkey, in Romania, at the mouth of a river which runs into the Black sea; formerly a bishop's see; 16 miles E.N.E. of Burgas. N. lat. $42^{\circ} 38'$. E. long. $27^{\circ} 47'$.

MESEMBRYANTHEMUM, in *Botany*, a vast genus of succulent plants, formerly known by the name of *Ficoidea*, from its affinity to the Indian Fig, or *Castus*. Breynius first named it *Mesembryanthemum*, meaning to express its flowers expanding at mid-day, which is true of many of the species, but not of all. Dillenius therefore, by altering one letter in the orthography, had recourse to another etymology, from *μεσος*, the middle, *εμβρυον*, an embryo, and *αθος*, a flower; because the embryo (meaning the germen) is in the middle of the flower; which indeed, as that author most truly remarks, is the case with innumerable plants besides, but not exactly as in the present genus. He observes that the flower does not altogether stand on the top of the fruit, but is perforated, as it were, by the latter, whilst it so closely adheres to the middle, as not to be separable from it without laceration. We confess our predilection for the original idea of Breynius, which if not strictly applicable to all the species, one or more of which are night-scented flowers, is strikingly apposite to the generality, whose resplendent and radiating petals seem to welcome, as well as to emulate, the noon-tide sun, folding themselves up as it withdraws. Fig-Marigold.—Dill. Elth. 225. Linn. Gen. 252. Schreb. 340. Willd. Sp. Pl. v. 2. 1025. Mart. Mill. Dict. v. 3. Ant. Hort. Kew. ed. 2. v. 3. 212. Juss. 317. Lamarek Dict. v. 2. 474. Illustr. t. 438. Gærtn. t. 126.—Class and order, *Icosandria Pentagynia*. Nat. Ord. *Succulenta*, Linn. *Ficoidea*, Juss.

Gen. Ch. Cal. Perianth superior, of one leaf, in five acute, spreading, permanent segments. Cor. Petals numerous, linear-lanceolate, in many rows, rather longer than the calyx, slightly united into a tube by their claws. Stam. Filaments numerous, capillary, the length of the calyx, inserted into its fleshy part within the petals; anthers incumbent. Pist. Germen inferior, with five obtuse angles; styles generally five, sometimes four or ten, awl-shaped, spreading; stigmas simple. Peric. Capsule fleshy, roundish, marked with rays at the summit, the cells and valves each answering to the styles in number. Seeds numerous, roundish, affixed to the central column.

Ess. Ch. Calyx five-cleft. Petals numerous, linear, cohering at the base. Capsule fleshy, inferior, with many seeds.

Fifty species of *Mesembryanthemum* are defined in the 14th ed. of *Syst. Veg.* disposed in three sections, distinguished by the flowers being white, red, or yellow. Thunberg in his *Prodromus* has but 72; Willdenow mentions 86; but the new edition of the *Hortus Kewensis* enumerates 175. The labours of Mr. Haworth, who has published, in an octavo volume, an ample Monograph of the present genus, and who has, for many years, investigated and cultivated all the species he could procure, has thrown great light upon the subject, though we are not able to follow him in all that he describes, for want of having seen them so completely. They are almost exclusively the productions of the arid sands of the Cape of Good Hope; a very few only being found in New Holland, and New Zealand, or in the south of Europe. We shall therefore mention the native countries of such only of those we are about to particularize, as are found in other places, though even these are often likewise natives of the Cape; as the *crystallinum* and *nodiflorum*. There they are all at home. Their peculiarly succulent nature, like that of Aloes, is calculated to resist the

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the burning sun and long-continued drought of that climate, their cuticle allowing of very slow perspiration, though of ready absorption; so that however exhausted they may be, they revive from the slightest shower. This wonderful provision of nature exists only in the living plant. When killed by momentary immersion in hot water, these succulent plants dry nearly as quick as any others. The horticulturists of Europe are best acquainted with the numerous perennial species of the genus before us. There have indeed been some annual ones raised here, but we have reason to think there are many almost entirely unknown. Some of these bear very curiously-constructed capsules, which expand by moisture, contrary to the nature of capsules in general, that their seeds may be dispersed in the wet season, when alone they would, in such a country, have any chance of germinating. (See Sm. *Introductio ad Botanicam*, 277. f. 178.)—We shall mention a few species of each of the 13 sections into which this genus is distributed in *Hort. Kew.*

1. *Stemless*; *inversely conical, or obovate, or more rarely spherical, the leaves being extremely abrupt, and united even to their summits, the flowers solitary.* Seven species in *Hort. Kew.*

M. minutum. Tiny Fig-Marigold. Ait. n. 1. Sims in *Curt. Mag.* t. 1376.—Smooth, glaucous, spotless, nearly globose, umbilicated. Bases of the petals forming a tube nearly as long as the borders.—This singular plant appears a congeries of glaucous balls, each about the size of a small gooseberry, hollowed out at the top, from whence springs a rose-coloured, sessile, solitary flower, larger than a daisy, with yellow stigmas, and a pale tubular base, composed of the united claws of the petals, by which it is elevated much above the calyx. This species blossoms from the middle of November to near Christmas, after which it must be kept without water through the winter, being preserved from frost.—Six more of this curious section are described by Mr. Haworth, and in *Hort. Kew.*, all sent from the Cape at different times by the late Mr. Francis Masson. See MASSON.

2. *Nearly stemless, with a perennial root.* Thirty-eight species.

M. calamiforme. Quill-leaved Fig-Marigold. Linn. Sp. Pl. 690. Willd. n. 20. Ait. n. 16. Dill. Elth. 239. t. 186. f. 228. (*Ficoides capensis humilis, capæ folio, flore stramineo*; Bradley Succ. Pl. t. 19.)—Leaves nearly cylindrical, acute, glaucous, finely dotted; flattened just above their base. Styles eight.—The numerous upright or ascending leaves, about a finger's length, compose dense glaucous tufts. Flowers large, of a brilliant white with pale lemon-coloured stamens, each on a very short, solitary, slightly leafy, stalk, not so tall as the leaves. This is one of the oldest inhabitants of our gardens. Bradley published it in 1717.

M. felinum. Cat-chap Fig-Marigold. Haworth n. 35. Willd. n. 11. Ait. n. 29. (*M. ringens* ♂; Linn. Sp. Pl. 698. *M. rictum felinum representans*; Dill. Elth. 240. t. 187. f. 230. *Ficoides afra, folio triangulari cusiformi crasso brevi, &c.*; Mart. Dec. t. 30.)—Stem none. Leaves glaucous, fringed with vertical taper-pointed teeth; cartilaginous at the extremity.—This has been long known in England, and thrives well in the dry stove, flowering for some time during autumn. It is distinguished by the idea which its opposite leaves, fringed with long vertical hooked teeth, convey of the widely-gaping mouth of a cat. The flowers are sessile, large, lemon-coloured, opening in the afternoon, and closing at night.

M. tigrinum, and caninum are nearly akin to this; and the latter was confounded with it by Linnæus.

M. præpingue. Soft Tongue Fig-Marigold. Ait. n. 38. (*M. heterophyllum*; Andr. Repof. t. 540.)—Leaves tongue-shaped, very tender; the younger ones finely fringed, incurved at the point.—This flowered at Mr. Lambert's, at Boyton. The herbage is peculiarly succulent and tender, of a grass green, and shining. Flowers large, yellow, on shortish stalks. Capsule closed when dry, expanding with moisture, as in some annual species above-mentioned, and, as it appears by the account in Andrews, (which, if we mistake not, came from the pen of the late excellent Mr. George Jackson, see JACKSONIA), in many perennial ones; perhaps in all the genus.

M. dolabriforme. Hatchet-leaved Fig-Marigold. Linn. Sp. Pl. 699. Ait. n. 45. Curt. Mag. t. 32. (*M. folio dolabriformi*; Dill. Elth. 248. t. 191. t. 237. *Ficoides capensis humilis, foliis cornua referentibus, petals luteis, noctiflora*; Bradl. Succ. Pl. t. 10.)—Stem short. Leaves compressed, with a very prominent dilated keel, and a cylindrical base.—Although the growth of this species be very slow, it has always more or less of a decided thick woody much-branched stem, so that few students would seek it in this section. The leaves are very peculiarly formed, as above described, and are the only instance of the hatchet shape; see Sm. *Intr. to Bot.* 171. f. 98. The flowers are plentifully produced, yellow, on longish, solitary, terminal stalks, and expand in the evening and night only.

3. *Stems prostrate. Leaves clustered, elongated. Petals yellow, either on both sides, or on the upper one only.* Five species.

M. loreum. Leathery-stalked Fig-Marigold. Linn. Sp. Pl. 694. Willd. n. 48. Ait. n. 46. Dill. Elth. 264. t. 200. f. 255.—Leaves semicylindrical, somewhat triangular, elongated, recurved, rather glaucous, in round tufts. Stems lax, roundish, slender, whitish. Flowers axillary.—Though this has been generally cultivated in England for above 80 years, nothing is recorded of its blooming. Willdenow however describes the flowers as very rarely produced in the collection of Engelbert Gother, each on a short axillary stalk, from the lower leaves of the branch, with a purple corolla, and whitish stamens. The plant is known by its long trailing twine-like shoots, bearing several little tufts or knots of leaves, and generally dependent over the edges of the garden-pot.

4. *Leaves very long, alternate, closely crowded into tufts. Stem decumbent when old. Petals very narrow, fringed from the base to the middle.* Three species.

M. capitatum. Short Dagger-leaved Fig-Marigold. Haworth. Ait. n. 52. (*M. pugioniforme*; Linn. Sp. Pl. 699. Willd. n. 80. *M. pugioniforme, flore amplo stramineo*; Dill. Elth. 280. t. 210. f. 269. *Ficoides capensis, caryophylli folio, flore aureo specioso*; Bradl. Succ. Pl. t. 14.)—"Leaves awl-shaped, triangular with equal sides, glaucous. Membranes of the calyx pale. Petals yellow, as long as the calyx; the outer ones purplish. Styles bristle-shaped, straight."—A fine large branching species, distinguished by the great size of its flowers, which are nearly as broad as the palm of the hand, of a brilliant straw-colour, purplish underneath, opening in sun-shine only. The leaves are numerous, curved, three or four inches long. This is the original *M. pugioniforme*, and we do not well understand why that name should be transferred to another species, which it seems is so called in a French work on Succulent Plants, t. 72, and which has more compressed leaves, the membranes of the calyx brown, petals entirely straw-coloured, shorter than the calyx, and linear-lanceolate expanded styles.

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5. *Leaves flat, often somewhat keeled beneath. Stems often decumbent or prostrate, widely spreading. Seventeen species.*

M. crystallinum. Ice-plant. Linn. Sp. Pl. 688. Willd. n. 25. Ait. n. 54. (*M. crystallinum*, *plantagina folio undulato*; Dill. Elth. 231. t. 180. f. 221. *Ficoides africana*, *folio plantagine undulato*, *micis argenteis asperis*; Bradd. Succ. Pl. t. 48.)—Leaves alternate, ovate, waved, papillary. Flowers sessile. Segments of the calyx ovate, broad.—Linneus, not without reason, doubted whether this species came from Africa. Thunberg, however, found it at the Cape of Good Hope. The late Dr. J. Sibthorp gathered it about Athens. In gardens the plant has long been known, as a tender annual, much admired for appearing as if frosted over; or encrusted with sugar. This appearance is caused by innumerable little bladders in the cuticle, filled with limpid juice. To the touch the whole herb is cold, and remarkably flaccid. Its stem spreads widely on the ground, in a rank mode of growth, bearing numerous broad undulated leaves, and copious, nearly sessile, flowers, of a pale rose or flesh-colour. The fruit is dark purple.

M. pinnatifidum. Jagged-leaved Fig-Marigold. Linn. Suppl. 260. Willd. n. 23. Ait. n. 55. Curt. Mag. t. 67.—Leaves oblong, pinnatifid, papillary. Flowers axillary, on longish stalks.—This also is an annual, whose seeds, sent by Thunberg from the Cape, vegetated in the Upsal garden. The pinnatifid leaves, and small yellow long-stalked flowers, are its characteristics.

M. cordifolium. Heart-leaved Fig-Marigold. Linn. Suppl. 260. Willd. n. 24. Ait. n. 65. Sm. Spicil. t. 6. Jacq. Ic. Rar. t. 487.—Leaves stalked, papillary, heart-shaped or ovate. Stem round. Calyx often four-cleft.—Soon after the first introduction of this species, it was common in every green-house, but is now rather neglected. The stems are shrubby, though long and trailing. Leaves darkish green. Flowers small, deep crimson. It is readily propagated by cuttings.

6. *Leaves linear; the younger ones channelled above, convex beneath. Branches often somewhat shrubby. Root mostly perennial; rarely annual. Seventeen species.*

M. nodiflorum. Neapolitan Fig-Marigold. Linn. Sp. Pl. 687. Willd. n. 56. Ait. n. 71. (*Kali floridum repens Neapolitanum*; Column. Ecphr. t. 73.)—Leaves alternate, nearly cylindrical, obtuse; fringed at the base.—Native of the sea-coasts of the south of Europe, and north of Africa. Root annual. Stem branched from the bottom, spreading, covered, like the leaves, with pellucid watery vesicles, as in *M. crystallinum*, but rather less glaucous. Flowers lateral or axillary, sessile, solitary, small and unornamental, with narrow white petals and yellow stamens. The segments of the calyx are oblong, obtuse, leafy, very unequal in size.

M. viridiflorum. Green-flowered Fig-Marigold. Willd. n. 51. Ait. n. 74. Curt. Mag. t. 326.—Leaves semi-cylindrical, hairy, somewhat papillary. Calyx hairy. Petals capillary. Stem tumid. Branches diffuse.—A shrubby species, singular in having green petals, which are very copious, and as narrow as a fine thread. The herbage is downy all over, slightly glaucous and papillary. It blooms from July to September, and is readily increased by cuttings. Mr. Masson sent this from the Cape in 1774.

7. *Evening-flowering; with slender, shrubby, hard, greatly defoliated stems; nearly cylindrical undotted leaves; a four-cleft calyx; fragrant flowers, white on their upper side; roots much swelled with age, having very few fibres. Two species.*

M. noctiflorum. Night-flowering Fig-Marigold. Linn. Sp. Pl. 689. Willd. n. 41. Ait. n. 88. *M. noctiflorum*. flore intus candido, extus phœniceo, odoratissimo; Dill.

Elth. 273. t. 206. f. 262.)—Leaves remote, obscurely semicylindrical, distinct, glaucous. Bark white—Highly desirable for the sake of its flowers, whose scent in an evening is like the Scarlet *Craffula*, or the finest Bergamot Pear. The stem is shrubby, pale, upright, round, cross-branched at the top. Flowers on longish stalks, from the ends or forks of the branches, with a thick pear-shaped germen, and short four-cleft calyx, much exceeded by the numerous pale petals, whose under side is either red or yellow.

M. stramineum. Straw-coloured Sweet Fig-Marigold. Haworth. Ait. n. 89. (*M. noctiflorum* β ; Linn. Sp. Pl. 689) Willd. n. 41. *M. noctiflorum*, flore intus candido, extus stramineo, odoratissimo; Dill. Elth. 274. t. 206. f. 263.)—Leaves remote, nearly cylindrical, distinct, rather glaucous. Bark grey.—Mr. Haworth agrees with Dillenius, who strenuously insisted on this being specifically distinct from the last, of which most writers make it a variety. The flowers are larger, very white above, pale yellow beneath. They expand only in an evening, like the last, and smell like the Dame's Violet, or Rocket (*Heesperis*).

8. *Flowers generally reddish. Branches shrubby, smooth. Leaves triangular and compressed (except M. laeve, Ait. n. 93), naked, with straight points. Thirty-nine species.*

M. spectabile. Showy Fig-Marigold. Haworth Me-
seembry. 385. Willd. n. 73. Ait. n. 98. Curt. Mag. t. 396.—Leaves crowded, triangular, elongated, glaucous, somewhat curved. Stem woody, ascending.—Introduced by Mr. Masson in 1787. Its fine large crimson flowers, produced all summer long, render this one of the most desirable, nor is it difficult of culture. Mr. Curtis observes that the leaves, which are very glaucous, and often tinged with red, sometimes acquire a prominent tooth or appendage on their upper side near the point.

M. acinaciforme. Scimitar-leaved Fig-Marigold. Linn. Sp. Pl. 695. Willd. n. 83. Ait. n. 116. Andr. Repos. t. 580, not 508. (*M. acinaciforme*, flore amplexissimo purpureo; Dill. Elth. 282. t. 211. f. 270, and t. 212. f. 271.)—Leaves scimitar-shaped, dotless, combined at their base; their margins minutely undulated and rough. Petals lanceolate.—One of the first species brought to Europe, and one of the largest and most ornamental when it flowers, which unfortunately is but of rare occurrence. Andrews says this was accomplished by Mr. Trimmer of Brentford, by training the branches up against the glass, and watering the plant very sparingly. The leaves are numerous, three inches long, very glaucous. Flowers terminal, solitary, as broad as the hand, formed of innumerable recurved bluntish petals, of a fine crimson, with white filaments and yellow anthers.

M. edule. Eatable Fig-Marigold. Hottentot's Fig. Linn. Sp. Pl. 695. Willd. n. 85. Ait. n. 119 (*M. falcatum majus*, flore amplo luteo; Dill. Elth. 283. t. 212. f. 272.)—Leaves with three equal sides, dotless, somewhat channelled; tapering at each end; keel finely serrated. Angles of the branches smooth and entire.—This is said to have been one of the Cape plants, brought from Holland by the first Earl of Portland. It rarely flowers here, and not till the plant is old and woody. It nearly vies with the last in size, but the flowers are yellow. The fruit is reported to be eaten at the Cape, both by the Hottentots and the Dutch settlers.—The colour of this flower is an exception to the character of the section, but its close affinity to some of the other species has superseded that one particular mark.

9. *Flowers yellow, orange, or scarlet. Stems rather shrubby, often erect. Leaves triangular, for the most part very short. Twelve species.*

M. aureum.

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M. aurum. Golden-flowered Fig-Marigold. Linn. Syft. Nat. ed. 10. v. 2. 1060. Willd. n. 75. Ait. n. 136. Curt. Mag. t. 262.—Leaves triangular, somewhat cylindrical, dotted, distinct. Petals orange. Styles deep purple.—A bushy species, long cultivated here, and easily increased, known by its rather large orange-coloured *corolla*, pale yellow *stamens*, and five purple *styles*, spreading like a star. The *leaves* are glaucous, tumid between their angles, about one inch and a half long. So great a similarity between the species of this section exists in the form of their *leaves*, that botanists are obliged to recur to the colours of the parts of fructification, which experience proves, in this case, to be constant. The *aurum* blossoms from February to May, being one of the earliest of its genus.

M. tenuifolium. Slender-leaved Fig-Marigold. Linn. Sp. Pl. 693. Willd. n. 45. Ait. n. 140. (*M. tenuifolium procumbens*, flore coccineo; Dill. Elth. 264. t. 201. f. 256.)—Leaves femicylindrical, awl-shaped, slightly compressed, green, smooth, longer than the joints of the branches. Petals scarlet. Stems decumbent.—Cultivated at Chelsea in 1700. Its procumbent habit, and slender scarcely glaucous *foliage*, mark this species. The *flowers* are plentiful about Midsummer, rather large, of a light brilliant scarlet, each lasting several days.

10. *Leaves more or less hooked at their points, distinct (without thickened sheaths) at the base. Petals reddish. Stems somewhat shrubby, very rarely creeping.* Ten species.

M. tuberosum. Tuberous-rooted Fig-Marigold. Linn. Sp. Pl. 693. Willd. n. 44. Ait. n. 146. (*M. fruticescens*, radice ingenti tuberosa; Dill. Elth. 275. t. 207. f. 264.)—Leaves bluntly triangular, compressed, minutely papillary; recurved at the ends. Root tuberous, very large.—Brought from the Cape at the beginning of the last century. The root consists of several large ovate knobs, almost like those of a *Dahlia*. Stems woody, variously branched and curved. *Leaves* about an inch long, convex above. *Flowers* small, dull red, in terminal dichotomous panicles, whose permanent stalks often become spinous.

The *flowers* in this section are among the least beautiful of the genus.

11. *Leaves triangular, strongly united, so as to be perfoliate; their sheaths fleshy; their tips hooked. Stems hard, woody. Flowers mostly white, rarely reddish.* Twelve species.

M. perfoliatum. Great Perfoliate Fig-Marigold. Ait. n. 152. (*M. uncinatum* β ; Linn. Sp. Pl. 692. Willd. n. 79. *M. perfoliatum*, foliis majoribus triacanthis; Dill. Elth. 251. t. 193. f. 240.)—Leaves strongly united at the base, pointed, dotted; their keel three-toothed at the summit.—A bushy plant, of rather slow growth, remarkable for two sharp teeth, besides the terminal one, at the back of its strongly perfoliate *leaves*. The *flowers* are purple, not frequent, produced after Midsummer.

M. uncinatum α of Linnæus and Willdenow, Dill. f. 239, differs in its smaller size, and having but one tooth below the point of the *leaves*.

M. umbellatum. Umbel-flowered Fig-Marigold. Linn. Sp. Pl. 689. Willd. n. 42. Ait. n. 162. (*M. fruticescens*, floribus albis umbellatis; Dill. Elth. 276. t. 208. f. 266. *Ficoides africana erecta teretifolia*, floribus albis umbellatis; Herm. Parad. 166. t. 166. Bœadl. Succ. Pl. dec. 4. 12. t. 44, not 34.)—Leaves rather glaucous, rough with minute dots, remote, elongated, slender; their points recurved; their sheaths greatly thickened upwards.—This, according to Hermann, was early plentiful in the gardens of Holland. The *stem* is often two feet high. *Leaves* two inches long, spreading, channelled above, bearing axillary tufts of smaller

ones. *Flowers* white, about as big as a daisy, many together in a forked umbel-like *panicle*, not a real umbel.

12. *Stems shrubby, their branches more or less rough.* Five species.

M. micans. Glittering Fig-Marigold. Linn. Sp. Pl. 696. Willd. n. 54. Ait. n. 163. Curt. Mag. t. 448. (*M. micans*, flore phœniceo, filamentis atris; Dill. Elth. 292. t. 215. f. 282.)—Leaves femicylindrical, blantish, papillary, slightly recurved. Segments of the calyx rather pointed. Petals acute.—An old inhabitant of our greenhouses, distinguished by its glittering, glaucous, often purplish, *leaves* and *branches*, and the very rich orange scarlet of its *flowers*, which however are not so lasting as beautiful. The dark purple *stamens* form a striking contrast with the *corolla*.

Mr. Haworth's *M. speciosum*, Ait. n. 164, seems to us but a variety of this, with blunter *petals* whose claws are green.

13. *Branches, or leaves, or the tips of the leaves, more or less bipid.* Eight species.

M. bipidum. Purple Bristly Fig-Marigold. Linn. Sp. Pl. 691. Willd. n. 61. Ait. n. 168. Mill. Ic. t. 176. f. 3. (*M. pilosum micans*, flore saturantèr purpureo; Dill. Elth. 289. t. 214. f. 277, 278.)—Leaves cylindrical, blunt, papillary, without hairs, as well as the calyx. Stamens longer than the pistils. Branches very hairy.—Common in greenhouses, flowering most part of the year. The very bristly *stem* and *branches*; thick, deflexed, blunt *leaves*, and large *flowers*, of a shining violet purple, distinguish the present from all we have hitherto noticed.

Linnæus made several varieties of this, which are the *floribundum*, *friatum*, and perhaps *hirtellum*, Ait. n. 169, 171, and 170, all nearly akin, but we mean not to say they are one species. The citation of Willdenow under the *floribundum* in *Hort. Kew.* should be *M. bipidum* β .

M. barbatum. Trailing Bearded Fig-Marigold. Linn. Sp. Pl. 691. Willd. n. 63. Ait. n. 173. Curt. Mag. t. 70. (*M. radiatum*, ramulis prolixis recumbentibus; Dill. Elth. 245. t. 190. f. 234.)—Leaves remote, somewhat ovate, tumid, papillary; flatish above; tipped with five radiating bristles. Branches slender, smooth, straggling. Calyx five-cleft.—Very common in greenhouses, and even in the garret windows of many a humble collector. The radiating bristles at the end of the tumid *leaves* are remarkable, and are but about five in this species. The *flowers* appear in July, and are of a rich violet purple. Linnæus by mistake quotes Miller's t. 176. f. 3, for the present plant, instead of the *M. bipidum*. Willdenow has it under both.

M. densum. Dwarf Bearded Fig-Marigold. Haworth. Ait. n. 175. Curt. Mag. t. 1220. (*M. barbatum* γ ; Linn. Sp. Pl. 691. Willd. n. 63. *M. radiatum humile*, foliis majoribus; Dill. Elth. 248. t. 190. f. 236.)—Stem very short. Leaves densely crowded, femicylindrical, papillary, tipped with many radiating bristles; their base somewhat fringed. Calyx six-cleft, very hairy, as well as the flower-stalks.—Dillenius says this was plentiful with him, but he never remembered its blooming. Mr. Haworth kept it 21 years without seeing a flower. We perfectly agree with Dr. Sims that this gentleman has shewn his judgment in separating this, as well as his *bisutum*, Dill. f. 235, from the *barbatum*, under which Linnæus had confounded them all. The *flower* of the *densum* is twice as large as that of either of the others, with conspicuous yellow *anthers*; and the white membranous itary bristles, at the end of each leaf, are very striking.

MESEMBRYANTHEMUM, in *Gardening*, comprehends plants of the succulent flowery exotic kinds, of which the species cultivated are, the diamond fig marigold, or ice plant (*M. crystal-*

MESEMBRYANTHEMUM.

orysallinum); the pinnated fig marigold (*M. pinnatifidum*); the plane-leaved fig marigold (*M. tripolium*); the small-flowered fig marigold (*M. caducum*); the angular-flaked fig marigold (*M. populifolium*); the jointed fig marigold (*M. geniculiflorum*); the night-flowering fig marigold (*M. noctiflorum*); the shining fig marigold (*M. splendens*); the umbrella-leaved fig marigold (*M. umbellatum*); the horse-leek-leaved fig marigold (*M. expansum*); the quill-leaved fig marigold (*M. calamiforme*); the daisy-flowered fig marigold (*M. bellidiflorum*); the delta-leaved fig marigold (*M. deltoidea*); the bearded fig marigold (*M. barbatum*); the brittle fig marigold (*M. hispidum*); the hairy-flaked fig marigold (*M. villosum*); the rugged fig marigold (*M. scabrum*); the creeping fig marigold (*M. reptans*); the hook-leaved fig marigold (*M. uncinatum*); the thorny fig marigold (*M. spinosum*); the tuberous-rooted fig marigold (*M. tuberosum*); the slender-leaved fig marigold (*M. tenuifolium*); the upright-shrubby fig marigold (*M. stipulaceum*); the thick-leaved fig marigold (*M. crassifolium*); the pickle-leaved fig marigold (*M. falcatum*); the clustered fig marigold (*M. glomeratum*); the two-coloured fig marigold (*M. bicolorum*); the ferrate-leaved fig marigold (*M. ferratum*); the glittering fig marigold (*M. micans*); the spit-leaved fig marigold (*M. veruculatum*); the glaucous-leaved fig marigold (*M. glaucum*); the horned fig marigold (*M. corniculatum*); the ringent fig marigold (*M. ringens*); the hatchet-leaved fig marigold (*M. dolabriforme*); the various-leaved fig marigold (*M. difforme*); the white fig marigold (*M. albidum*); the tongue-leaved fig marigold (*M. linguiforme*); the dagger-leaved fig marigold (*M. pugioniforme*); the twisted-leaved fig marigold (*M. tortuosum*); the notch-flowered fig marigold (*M. emarginatum*); and the bracteated fig marigold (*M. bracteatum*).

In the seventh species there is a variety in which the flowers are somewhat larger, and of a very pale yellow on the outside.

The thirteenth sort has different varieties; as the great delta-leaved, and the small delta-leaved marigold.

The fourteenth species has also several varieties; as the shrubby, bearded, the small dwarf-bearded, and the great dwarf-bearded.

And in the fifteenth kind there are different varieties; as the purple-flowered, the pale-flowered, and the stripe-flowered.

The nineteenth species likewise affords different varieties.

It may be noticed, that the twenty-sixth species is very variable, assuming different appearances, according to its treatment, and the different stages of its growth: its very numerous beautiful purple flowers, covering the whole plant, and produced every season, make it a valuable species in all cases.

The twenty-ninth species varies with paler and smaller flowers.

And the thirtieth varies with shorter and more manifestly three-sided leaves and fewer flowers.

The thirty-second species has a variety which throws out many procumbent branches, tough at the lower part, but not properly woody, herbaceous at the upper part, about three inches in length, round or slightly angular, jointed at short intervals, with bluntly triangular leaves, from which other leaves spring in bundles, of the same form but shorter; the root-leaves and those at the base of the branches remarkably long: the leaves bend like the horns of kine, whence the trivial name.

In the thirty-third species there is a variety which is entirely sessile, of a whitish glaucous colour, with the leaves

pale at the base, with frequent round whitish dots, especially towards the end; they are shorter than those of the original, more recumbent, less triquetrous, but with a rounder back, and more frequent, longer incurved prickles, terminated by slender harmless spicule, which are sometimes white, sometimes reddish: the leaves have a white line at the end, which is continued towards the back: there is first a flower in the middle, and afterwards several come out successively at the sides, all sessile. This is called *Cat-chap marigold*.

Mr. Haworth has two other varieties; the *Tiger-chap fig marigold*, which is stemless in all the stages of its growth; being more succulent and gross than the following: the leaves are rather shorter, beset with much longer hairs on the sides, and having numerous whitish spots: the flowers are sessile, yellow, and large; and the *Mouse-chap fig marigold*, in which the branches in very old plants are some inches long, and numerous, forming a fine tufted plant; the flowers small and of a yellow colour.

The thirty-seventh species has several varieties.

In the first the leaves are wide and compressed about the edge; the flowers somewhat large, with blunt petals, scattered and not numerous, with scarcely any peduncle; one plant has several heads, from each of which are produced clusters of leaves in pairs, disposed like those of the Tongue-aloes, but with the edges not horizontal but oblique; there are generally three or four pairs of these leaves; they are broad and thick, flat above, pillowed below, bright green, smooth and shining, sometimes blunt, sometimes a little pointed, generally in the shape of a shoemaker's knife; the younger leaves in this and the other varieties, are folded together and obliquely inserted into each other; the flowers come out successively in August and September from the axils, beginning with the lowest; they are subsessile, large, yellow, somewhat paler than in the following variety, shining in the sun; petals somewhat blunter, entire, or sometimes cut here and there.

The *Broad tongue-leaved* variety has thick leaves, flat above, convex beneath, with the margins thicker and less upright than in the preceding, smooth and shining, pale green, especially towards the base, when held up to the light appearing to be composed of innumerable vesicles; three or four pairs of these leaves lie in the same inclined plane; these are sometimes flatter and blunt at the end, sometimes very much cut at the edge; from the lower pair first, and then from the next, a short peduncle arises, obtusely triquetrous, bearing a large flower of a shining golden colour, with many stamens, having oblong golden anthers.

The *Narrow tongued-leaved* variety is very like the preceding, but the petals have a slight tinge of red on the outside; the older leaves are more reflex; the younger ones, which are closer and more luxuriant, are somewhat twisted in and excavated, and are of a fuller green colour, the fruit is smaller and softer, not elevated, but rather depressed, roundish, and commonly streaked with eleven angles; it is generally eleven-celled; the cells being the same in number as there are horns of the style, which are depressed at the bottom of the flower under the stamens, and are curled and wrinkled; the petals in two or three rows, almost of the same length, of a shining yellow colour.

There is another variety, which is distinguished from the others by the leaves being longer and more erect; the peduncles of the flowers longer; the capsules less globular, commonly divided into nine cells; the calycine segments four, three longer and narrower, one shorter and broader, with a membranaceous margin; the flowers have a double or triple row of petals, shining in the sun with the splendour

of gold; the stamens numerous, with oblong saffron-coloured anthers.

Method of Culture.—Those of the annual and biennial kinds may be increased by sowing the seeds in the early spring months on a fresh hot-bed, covered with sandy earth, or in pots of fine sandy mould. And when the plants have attained a few inches in growth they may be planted on fresh hot-beds, or in pots plunged in them, to bring them forward; and as soon as they have taken root, they should have very little water; when of sufficiently large size, each should be planted in a small pot, filled with light fresh earth, but not rich, plunging them into a hot-bed of tan, shading them in the heat of the day until they have taken new root, when they should have plenty of fresh air. About the beginning of summer some of the plants may be inured to the open air, and afterwards be turned out of the pots, and planted with balls of earth about them in a warm border, where they often thrive and spread, but are not very productive of flowers in this way. Some mult also be continued in pots, and removed to the shelves of the stove, where they flower more plentifully.

The only culture which they afterwards require is, for those in the pots to have frequent slight waterings in dry weather, and the others to be kept clean, and their branches permitted to spread upon the surface of the ground.

All the perennial sorts may be readily increased by cuttings planted during the summer months. Those having shrubby stalks and branches, readily take root when planted out in beds or in pots of light sandy soil, covered with mats or glasses; in the latter case, being shaded when the sun is warm. The cuttings of these sorts need not be cut from the plant more than five or six days before they are planted, during which time they should be laid in a dry room, not too much exposed to the sun, that the parts which are separated from the old plants may heal over and dry, otherwise they are apt to rot. They may then be planted at about three inches distance from each other, the earth being pressed very close to them, and none of their leaves buried in the ground, as from their abounding in moisture, when they are covered with the earth, it is apt to cause them to rot, which often destroys the cuttings. When they are taken from the old plants, they should therefore be divested of their lower leaves, so as to allow a naked stalk of sufficient length for being planted in the earth.

Those in pots may be plunged in a hot-bed, or in a warm border, due shade and shelter being given, and slight waterings in dry weather. When they have stricken good roots, they should be removed with balls of earth into other separate small pots of light sandy mould, being placed in a shady situation, a very slight watering being given to settle the earth about them. After they become well rooted, they may be removed, so as to have more sun; when they may be kept till autumn, being watered very slightly twice a week in summer and once afterwards, care being taken to prevent their roots shooting through the pots, by shifting them two or three times in the summer season in order to pare them off.

In the autumn and winter they should be protected in the greenhouse.

The cuttings of the more succulent sorts should be left to heal over a much longer time, being a little freed from leaves, and covered with glasses to prevent the wet. They should have less water, and be removed less frequently. They succeed well in an airy glass case during the winter, when screened from frosts and severe weather.

And such sorts as do not afford cuttings, may be increased by planting and managing the bottom side-heads or off-sets

in the above manner. They may likewise be increased by seeds or cuttings readily in the stove department.

The only culture necessary afterwards is, merely to give water frequently in small quantities in summer, and very sparingly in winter, shifting the plants occasionally into larger pots.

These are mostly plants which afford a fine variety in greenhouse collections, and among other potted plants of similar growths.

MESEMMA, or BOUSEMMA, in *Geography*, a town of Africa, in the kingdom of Fez, inhabited by Arabs.

MESENTERIC, in *Anatomy*, from mesentery, an epithet used in describing parts connected with the mesentery. There are a superior and inferior mesenteric artery, branches of the abdominal aorta (see ARTERY): a superior and inferior mesenteric vein joining the vena portarum. (See LIVER.) The glands connected with the lacteals and with the absorbents of the large intestine, are called mesenteric, and the same term is applied to the nerves of the intestines.

MESENTERICA, in *Botany*, a genus of the fungus tribe, so called by Tode, from its resemblance to the human mesentery—Perf. Syn. 706. Tode Fung. Mecklenb. fasc. 1. 7.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. — Creeping, gelatinous, veiny; the ramifications of the veins joined by a thin membrane.

1. *M. lutea*. Perf. n. 1. (*M. tremelloides* α , lutea; Tode fasc. 1. 7. t. 2. f. 12.)—Lemon-coloured, or of a golden yellow.—Found after rain in the spring, sometimes in autumn, upon rotten wood, spreading to the breadth of two or three inches, like a fine veiny web, of a yellow colour, more or less deep; sometimes greenish. The margin at length swells, and assumes a bright yellow hue; whence Tode concluded that part to be the seat of the fructification. The whole is so delicate, that if exposed for twelve hours to a warm air, it decays entirely, leaving nothing but a few very minute scales.

2. *M. caerulea*. Perf. n. 2. (*M. tremelloides* β , caerulea; Tode fasc. 1. 8.)—Entirely of a glaucous blue.—Found once only, in September, on a half-rotten board. Tode.

3. *M. argentea*. Perf. n. 3. (*Corallo-fungus argenteus*, omenti forma; Vaill. Paris. 41. t. 8. f. 1.)—White, very broad; the margin tumid and downy. On old boards or poils in cellars, spreading from a little soft and tender tuft, as white as snow, into a membrane from four to twenty-four inches in extent, full of beautifully branching veins, and fringed at the margin. After some time, the whole turns reddish and decays.

MESENTERIUM, MESENTERY, in *Anatomy*, the process of peritoneum, by which the small intestine is retained in its position in the abdomen. See INTESTINE.

MESERCAN, in *Geography*, a town of Persia, in Chufistai; 36 miles S.S.E. of Sulter.

MESERJEEN, a town of Algiers; 5 miles S.W. of Oran.

MESERITSCH, or MESERIZCZ, a town of Moravia, in the circle of Prerau; 30 miles E. of Olmutz. N. lat. 49° 26'. E. long. 18° 2'.

MESERITSCH, GREAT, a town of Moravia, in the circle of Iglau; 18 miles W. of Olmutz. N. lat. 49° 23'. E. long. 15° 55'.

MESERITZ, a town of the duchy of Warsaw; 40 miles W. of Posen.

MESEWITZ, a town of Prussia, in the palatinate of Culm; 21 miles E.S.E. of Culm.

MESHES of *Nets*, the openings or interstices between the threads.

MESHTA,

MESITA, in *Geography*, a town of Egypt, on the left bank of the Nile; 7 miles N. of Tahta.

MESIANO, the name of two towns of Naples, in Calabria Ultra; one six miles N. E. of Bovà, and the other three miles N. of it.

MESINAN, a town of Persia, in the province of Mazanderan; 50 miles S. of Allabad.

MESIRE, a name given by Avicenna to a dilemma-ture of the liver, attended with a sense of heaviness, tumour, inflammation, and pungent pain, and always with thirst, a dry mouth, and a parched black tongue.

MESITICUM, among the Romans, a toll paid for a place to sell goods in the forum.

MESKOUTEEN, **HAMMAM**, *i. e.* the *silent or enchanted baths*, celebrated baths of Algiers, in the province of Constantina, situated on a low ground, surrounded with mountains. The water furnished by several fountains is intensely hot, and falls afterwards into the river Ze-nati. Other baths at a small distance are, comparatively, intensely cold; and still farther, nearer the banks of the Ze-nati, are the ruins of a few houses, built probably for the convenience of persons who came thither for the benefit of the waters; 36 miles E. of Constantina. Shaw's Travels.

MESLAY, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Laval. The place contains 1173, and the canton 10,154 inhabitants, on a territory of 245 kilometres, in 14 communes.

MESLE-SUR-SARTHE, a town of France, in the department of the Orne, and chief place of a canton, in the district of Alençon. The place contains 648, and the canton 9,364 inhabitants, on a territory of 157½ kilometres, in 20 communes.

MESLIN-CORN, in *Agriculture*, a term applied to wheat and rye produced in a state of mixture.

MESMARCHURES, in the *Manege*. See **PASTERN**.

MESMES, **CLAUDE DE**, *Count d'Arcaux*, in *Biography*, an eminent French negociator, descended from an illustrious family, was trained from an early period of life to public business, and was appointed counsellor of state in the year 1623. In 1627 he was sent as ambassador to Venice, in which quality he visited Rome, Mantua, Florence, and Turin. He next passed into Germany, where he held conferences with most of the princes of the empire. Soon after this he was dispatched upon public business to the more northern kingdoms of Poland, Denmark, and Sweden. In every undertaking he obtained a high character for probity as well as talents, and thus acquired an almost unlimited confidence with the foreign ministers, with whom he treated. This enabled him to act with considerable effect as plenipotentiary, from his court, at the general peace, concluded, in 1648, at Munster and Osnaburg. He did not confine himself wholly to the affairs of the state, but also maintained a regular correspondence with men of letters, of whom he was the friend and protector. He died at Paris in 1650. Moreri.

MESMES, **JOHN ANTONY DE**, *Count d'Arcaux*, and a nephew of the preceding, passed through a similar course of public employments with his uncle. He was appointed ambassador extraordinary to Venice from 1671 to 1674, and in the following year was one of the plenipotentiaries at the peace of Nimeguen. Some time after this he was ambassador in Holland, where he effected the truce with Spain by which Luxembourg was ceded to France. In 1689 he was the French ambassador to James II. while in Ireland. In 1692 he went out in the same quality to Sweden, and was very useful in settling the preliminaries of the peace of Ryf-wick. He died in 1709, at Paris, at the age of sixty-nine,

having passed an active and very useful life in the service of his country. A collection of his "Letters and Negotiations" was published in 1752, in six volumes 12mo. Moreri.

MESN, or **MESNE**, a term in *Law*, signifying him who is lord of a manor, and so hath tenants holding of him; yet he himself holds of a superior lord.

All the land in the kingdom is supposed to be holden, mediately or immediately of the king; who is styled the lord "paramount," or above all. Such tenants as hold under the king immediately, when they granted out portions of their lands to inferior persons, became also lords with respect to those inferior persons, as they were still tenants with respect to the king; and, thus, partaking of a middle nature, were called *mesne*, or middle lords. So that if the king granted a manor to A, and he granted a portion of the land to B, now B was said to hold of A, and A of the king; or, in other words, B held his lands immediately of A, but mediately of the king. The king was therefore styled lord paramount; A was both tenant and lord, or was a *mesne* lord; and B was called tenant "paravail," or the lowest tenant; being he, who was supposed to make "avail," or profit of the land. It is in this manner all the lands of the kingdom are holden, which are in the hands of subjects. Bl. Com. b. ii.

The word is properly derived from *mesne*, *quasi minor natus*; because his tenure is derived from another, from whom he holds; or perhaps *mesne* is the same as *mean* or middle between two extremes, either in time or dignity.

MESN also denotes a writ, which lieth where there is lord *mesne* and tenant; and lies, when upon a subinfeudation the *mesne* or middle lord suffers his under-tenant, or tenant *paravail*, to be distrained upon by the lord paramount, for the rent due to him from the *mesne* lord. F. N. B. 135.

This is in the nature of a writ of right; and in this case the tenant shall have judgment to be acquitted or indemnified by the *mesne* lord; and if he makes default therein, or does not appear originally to the tenant's writ, he shall be forejudged of his *mesnalty*, and the tenant shall hold immediately of the lord paramount himself.

MESN, or *Mesne process*. See **PROCESS**.

MESNA, in *Geography, a city of Africa, capital of Begarmee; 170 miles S. of Bornou. N. lat. 17. E. long. 22° 12'.*

MESNAGER, **NICHOLAS**, in *Biography*, an able negociator, was born at Rouen, in 1658, of a rich commercial family. He was sent by Louis XIV. to Spain on some important missions relative to the commerce of the Indies, and afterwards to Holland; on which occasions he gave so much satisfaction as to be created a chevalier of the order of St. Michael, with patents of nobility. In 1711 he signed the preliminary treaty of peace between France and England at London, and he was next employed with the abbé Polignac as plenipotentiary at Utrecht. He died at Paris in 1714. His memoirs have been printed. Moreri.

MESNARDIERE, **HIPPOLYTUS JULIUS PILET DELA**, a French poet, was born at Loudun in 1610, and died in 1663. He was a member of the French Academy, and patronized by cardinal Richelieu. His works are, 1. "A Treatise on Melancholy," 8vo.; 2. "Poetique," 4to.; 3. "The Tragedies of Alvide and La Pucelle de Orleans;" 4. "A Collection of Poems," &c.; 5. "Relations of War," &c. Moreri.

MESNEVY, or **MASNAVI**, in *Oriental Literature*, is a very celebrated work in the Persian language. The author is Jelal ud Din; Rumi is often added to his name, denoting that he was of Lower Asia. He died in 1262, and was buried in a monastery founded by him in the city of Konyeh

(Iconium) for an order of Dervishes. His work is the most esteemed of that numerous class of writings containing the doctrines of Sufism, (see *SUFĪ*) or emblematical theology, and for several centuries his tomb was visited by his devout countrymen, who consider his works as the effect of inspiration, and inferior only to the Koran. As well as religion and morality, the *Mesnevy* comprises also history and politics. The following character of it is taken from the last volume of sir William Jones's works. "So extraordinary a book as the *Mesnavi* was never, perhaps, composed by man. It abounds with beauties and blemishes equally great; with gross obscenity and pure ethics; with exquisite strains of poetry and flat puerilities; with wit and pleasantries mixed with dull jests; with ridicule on all established religions, and a vein of sublime piety. It is like a wild country in a fine climate, overspread with rich flowers and with the odour of beasts. I know of no writer to whom the *Maulavi* can justly be compared, except Chaucer or Shakspeare." The term *Maulavi*, here used, is usually applied to this great writer, denoting his literary reputation. Commentaries on his works, and abridgments, translations, and imitations of them, are very numerous in the different dialects of the East. See *MYSTICAL Poetry*.

MESNOI, in *Geography*, an island of Russia, in the straits of Vaigatskoi, N. lat. $70^{\circ} 4'$. E. long. $60^{\circ} 14'$.

MESOGHOROS, *μεσοχορος*, among the ancients. The *mesochori* were musicians who presided in concerts, and by beating a desk in a regular manner with their feet, directed the measure of the music. For this purpose in the theatre they wore wooden clogs on their feet, that they might be better heard, which were called by the Greeks *crupedia*.

MESOGHORUS, among the Romans, was also used for a person in public assemblies, appointed to give the signal for acclamation at the proper time, that all might join in it at once.

MESOCOLON, in *Anatomy*, the peritoneum connecting the colon in its situation. See *INTESTINE*.

MESOCUROS, *μεσοκουρος*, in *Antiquity*, an actress in tragedies, who had the middle part of her head shaven: but others think that *mesocuros* signifies a girl or very young woman.

MESODMES, or **MESOMEDES**, in *Biography*, a Greek lyric poet and musician, to whom the hymn to Nemesis, the last of the three hymns published in Dr. Fell's Oxford edit. of Aratus, with the original music, has been ascribed. It is not satisfactorily settled who this *Mesomedes* was, or at what time he lived. See *MUSIC of the Ancient Greeks*, for conjectures on the subject.

MESOGASTER, **MESOGASTRION**, in *Anatomy*, a name sometimes given to the lesser omentum. See *EPIPLOON*.

MESOGLOSSI, a name given by some writers to the muscles of the tongue, more usually called by anatomists the *genioglossi*.

MESOIDE, in the *Greek Music*, a kind of melopœia, the notes of which were confined to the two middle strings of the *meson* tetrachord.

MESOIDES, mean sounds, or sounds taken in the middle of the system. See *MELOPEIA*.

MESOLA, or **MEZOLA**, in *Geography*, a town of Italy, in the department of the Lower Po, near the coast of the Adriatic, on an island formed by a branch of the Po; 30 miles E.N.E. of Ferrara.

MESOLABE, **MESOLABIUM**, a mathematical instrument, invented by the ancients for finding two mean proportionals mechanically, which they could not come at geometrically. See *PROPORTIONAL*.

It consists of three parallelograms, moving in groove to certain interfections. Its figure is described by Eutocius, in his commentary on Archimedes.

MESO-LOGARITHM, a term used by Kepler to signify the logarithms of the co-sines and co-tangents; the former of which lord Napier calls *antilogarithms*, and the latter *differentiales*.

These are also called *artificial sines and tangents*.

MESON, in the *Ancient Greek Music*, is the name given to the second tetrachord from the bottom, and it was likewise the name by which the four strings of that tetrachord were distinguished: as the first string was called *hypate-meson*, the second *parhypate-meson*, the third *lichanos-meson*, or *meson-diatonos*, and the fourth *mesê*. *Meson* is the genitive case plural of *mesê*, mean or middle; because the *meson* tetrachord is the middle between the first and third tetrachord, or rather because the string or found *mesê* gives the name to the whole tetrachord, of which it is the highest note. See *Plate of the Greek Diagram*.

MESONYCTICUM, Lat., *μεσονυκτικον*, Gr., a midnight hymn in the Greek church.

MESO-PLEURII, derived from *μεσος*, middle, and *πλευρον*, rib, in *Anatomy*, the intercostal muscles.

MESO-PLEURII is sometimes also used for the intermediate spaces between the costæ, or ribs.

MESOPOTAMIA, in *Ancient Geography*, an extensive province of Asia, the Greek name of which denotes "between the rivers," and on this account Strabo says, "ἐν κείνῃ Μεσσηνίᾳ τῆς Εὐφράτης καὶ τοῦ Τίγριος;" that it was situated between the Euphrates and the Tigris. In Scripture this country is called "Aram," and "Aramæa." But as *Aram* also signifies Syria, it is denominated "Aram Naharaim," or the Syria of the rivers. This province, which inclines from the S.E. to the N.W., commenced at N. lat. $33^{\circ} 20'$, and terminated near N. lat. $37^{\circ} 30'$. Towards the south it extended as far as the bend formed by the Jordan at Cunaxa, and to the wall of Semiramis which separated it from *Mesene*. Towards the north, it comprehended part of *Taurus* and the *Mesius*, which lay between the Euphrates and the Tigris. The modern name, given by the Arabs to this part, is of the same import with the ancient appellation; they call it "isle," or in their language, "Al-Dgézera." In this northern part is found *Osrhoëne*, which seems to have been the same place with *Arthemusia*. The northern part of *Mesopotamia* is occupied by chains of mountains passing from N.W. to S.E., in the situation of the rivers. The central parts of these mountains were called "Singaræ montes." The principal rivers were *Chaboras* (Al Kabour), which commenced at *Charræ* (Harran), E. of the mountains, and discharged itself into the Euphrates at *Circesium* (Kirkisieh) (see *CHABOR*); the *Mygdonius* (Hanali), the source of which was near *Nisibis*, and its termination in the *Chaboras*. (See *MYGDONIUS*.) The principal towns, in the eastern part along the Tigris and near it, are *Nisibis* (Nisibin), *Bezabde* (Zabda), *Singora* (Sindja), *Labbana* on the Tigris (Mosul), *Hatru* (Harder), and *Apamea-Mesenes*. At some distance to the south, upon the Tigris and on the borders of *Mesopotamia*, was the town of *Antiochia*, near which commenced the wall that passed from the Tigris to the Euphrates, under the name of "Murus Mediæ," or "Semiramidis." In the western part were *Edeffa*, called also *Callin-Rhæ* (Orfa), *Charræ* (Harran), *Nicephorium* (Racca), *Circesium* at the mouth of the *Chaboras*, *Anatho* (Anah), *Neharda* (Hadith Unnour) upon the right of the Euphrates. There are several other towns of less importance, which our limits will not allow us to mention. According to Strabo, this country was fertile in vines,

vines, and afforded abundance of good wine. According to Ptolemy, Mesopotamia had on the north a part of Armenia, on the west the Euphrates, on the side of Syria, on the east the Tigris, on the borders of Assyria, and on the south the Euphrates which joined the Tigris. Mesopotamia was a satrapy under the king of Syria. See SYRIA.

MESOPYCNI, *μεσopycni*, in the *Ancient Music*, was an appellation given to such chords as formed the middle notes of the staff. There were five mesopycni in the scale. See PYCNI and STRISEM.

MESOREC PUM, in *Anatomy*, the process of peritoneum attached to the sigmoid flexure of the colon, and upper part of the rectum. See INTESTINE.

MESORO, in *Ichthyology*, a name given by Salvian to that fish which we call the butterfly-fish, the blennius or blennius of other authors.

MESON is also used by the Italians for the fish commonly called the *uranolescope*, or *star-gazer*.

MESOTHENAR, in *Anatomy*, a name given by Winslow to a muscle of the thumb. It includes the adductor pollicis, and a part of the flexor brevis. See ADDUCTOR and FLEXOR.

MESOTYPE, in *Mineralogy*. See ZFOHITE.

MESPILEUS LAPIS, in *Natural History*, a name given to some species of the echinite, from their resemblance to the ripe fruit of a medlar. This was a name given them before they were much known, and they were some time afterwards called, from their five lines on the surface, *pentaxoche*.

MESPILUS, in *Botany*. *μσπιλον* of the Greeks, the Medlar-Tree. Linn. Gen. 251. Schreb. 339. Willd. Sp. Pl. v. 2. 1010. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. v. 3. 205. Sm. Fl. Brit. 520. Juss. 335. Lamarck Dict. v. 4. 437. Illustr. t. 436. Michaux Boreal-Amer. v. 1. 291. Gært. t. 87. (*Cratægus*; Linn. Gen. 250. Schreb. 338. Willd. Sp. Pl. v. 2. 1000. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. ed. 2 v. 3. 200. Juss. 335. Lamarck Illustr. t. 433. Michaux Boreal-Amer. v. 1. 287. —Class and order, *Icosandria Pentagynia*. Sm. Intr. 427. Nat. Ord. *Pomacæ*, Linn. *Rosaceæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, concave, in five deep, spreading, permanent segments. *Cor.* Petals five, roundish, concave, with short claws, inserted into the calyx. *Stam.* Filaments about twenty, awl-shaped, inserted into the calyx, not longer than the corolla; anthers simple, roundish. *Pist.* Germen inferior; styles from two to five, (occasionally solitary,) simple, erect; stigmas capitate. *Peric.* Berry roundish, umbelicated, crowned with the closed calyx, but almost perforated in the centre. *Seeds* equal in number to the styles, bony, gibbous at the outer side, each with two kernels.

Ess. Ch. Calyx five-cleft. Petals five. Berry inferior. Seeds two to five, with two kernels.

Botanists have differed concerning the limits of this genus. The *Cratægus* of Linnæus is distinguished from his *Mespilus* solely by the former having but two styles, and occasionally, on the same tree, some flowers with but one; while the latter has five. *Sorbus* is supposed to differ from both in having three styles and as many seeds. Linnæus was well aware of the close relationship between all the three genera, and hints that there is scarcely any sufficient distinction between them. He adds however that "the leaves in *Sorbus* are usually pinnate, in *Cratægus* angular, in *Mespilus* undivided." This would indeed be a character in the habit too important to be overlooked, but unfortunately it is not founded in fact. *M. tanacetifolia* has not merely angular, but pinnatifid leaves, with the fructification of a per-

fect *Mespilus*, and is so naturally allied to the Hawthorn, *Cratægus Oxyacantha* of Linnæus, that nothing ought to distinguish them. As to *Sorbus*, the *domestica* is shown in *Engl. Bot.* v. 5. 152, to be a complete *Pyrus*, both by number and structure of all the parts; nor can the *anupuris* or the *hybrida* (more properly *pinnatifida*) be separated from it, as the number of their styles and cells is variable, though the coats of the latter are rather more cartilaginous than in the *domestica*. Other acknowledged species of *Pyrus* indeed have pinnate or pinnatifid leaves. (See *PYRUS*.) The writer of the present article therefore sees no reason to abrogate what is settled in the *Flora Britannica*, though Willdenow, not having seen that work till he got as far as *Tetradynamia*, has not adopted this correction; and the authors of the new edition of the *Hortus Kewensis* in general follow him, where they themselves have not particularly studied any subject. Hence five of the fourteen species of *Cratægus* in the last-mentioned work are defined with five styles or five seeds, one with three and another with four; a sufficient evidence of their being *Mespili*, in spite of their more or less angular foliage. It is scarcely necessary to observe that the fruit of these two supposed genera is exactly of the same nature. We now follow Linnæus and Gærtner in calling it a *bacca*, or berry, because it is found most convenient to restrict the term *drupa* to pulpy fruits with a solitary nut.

The number of styles is so ill calculated for a generic distinction in this case, that we cannot take advantage of it even to divide *Mespilus* into any tolerably natural sections. The form of the leaves, whether undivided, lobed, or pinnatifid, might serve better. None of this genus is known to have really pinnate leaves.

The species of *Cratægus* are nineteen in Willdenow, of *Mespilus* six; in all twenty-five. They are all either *trees* or *shrubs*, with very hard wood, often thorny; and they have stalked, alternate, almost always deciduous, leaves. Their flowers are corymbose, sometimes solitary; white with an occasional tint of red. Fruit mealy, red or yellow, seldom eatable. The whole genus is very patient of cold, partly American, partly European and Alpine, well calculated and much used for the adorning of shrubberies in this climate. It is remarkable that none of them have been published in that useful and deservedly popular work, the Botanical Magazine.

We shall indicate a few of the most valuable.

M. coccinea. Great American Hawthorn. (*Mespilus apii* folio virginiana, spinis horrida, fructu amplo coccineo; Pluk. Phyt. t. 46. f. 4. *Cratægus coccinea*; Linn. Sp. Pl. 682. Willd. n. 1. Ait. n. 1.)—Thorny. Leaves ovate, with angular incisions, serrated, smooth; heart-shaped at the base. Footstalks and calyx glandular. Styles five.—Native of Virginia and Canada. Cultivated by bishop Compton at Fulham in 1683. This is a spreading tree, with broad light green leaves, strong thorns, large white copious flowers, which appear in May, and scarlet fruit, as big as a small damson. Linnæus and Willdenow cite under this, synonyms of Miller (*l. t.* 179.) and the *Hort. Angl. t.* 13, which belong to *Mespilus cordata*, their *Cratægus*, n. 2.

M. parvifolia. Small-leaved Hawthorn. (*M. Xanthocarpus*; Linn. Suppl. 254. *Cratægus parvifolia*; Willd. n. 8. Ait. n. 7.)—Thorny. Leaves somewhat wedge-shaped, crenate, cut. Flowers nearly solitary. Segments of the calyx leafy, cut and serrated, as long as the fruit. Styles five.—Native of Virginia. Cultivated here in the time of bishop Compton. We are indebted to Messrs. Lee and Kennedy for a knowledge of this species, for Willdenow quotes a heap of erroneous synonyms, amongst others the

MESPILUS.

the *Cratægus tomentosa*, Linn. Sp. Pl. 682. The present shrub is remarkable for its stout, rigid habit; straight dark thorns, often two inches in length; small leaves, about an inch long, more or less downy; rather large flowers, mostly solitary, at the end of each short lateral shoot, with a long, leafy, green calyx. The fruit is said to be pale yellow, dotted with little black warts, and containing five seeds.

M. Oxyacantha. Common Hawthorn, White-thorn, or May. Gært. v. 2. 43. t. 87. Sm. Fl. Brit. 529. (*Cratægus Oxyacantha*; Linn. Sp. Pl. 683. Fl. Dan. t. 634. Bulliard. t. 333, with the flowers of *Prunus spinosa*! C. monogyna; Jacq. Austr. t. 292. *Oxyacanthus*; Ger. em. 1327.)—Thorny. Leaves obtuse, deeply three-cleft, serrated, smooth. Styles one or two.—Native of dry, open, stony countries in all parts of Europe, flowering in May or June. In the rich deep soil of Marshland it is particularly luxuriant, and the blossoms, usually white, assume there a pink hue. Double and rose-coloured varieties are often cultivated, as well as one with yellow, not scarlet, fruit. This tree is one of the greatest ornaments of our parks and hedges.

M. odoratissima. Downy Oriental Hawthorn. Andr. Repof. t. 590. (*M. tanacetifolia* β; Sm. Prod. Fl. Græc. Sibth. v. 1. 342.)—Thorny. Leaves deeply five-cleft, jagged; very downy on both sides. Styles five.—Native of the Levant. In Greece, and the fourth-western part of the Crimea. Cultivated by Messrs. Lee and Kennedy for some years past. Rather stouter than the Common Hawthorn, and distinguished by its very soft deep-cut leaves, larger highly fragrant flowers, and globular scarlet fruit, as big as a small gooseberry. Mr. Lambert discovered, by Pallas's herbarium, that this is the *Cratægus orientalis* mentioned by that intelligent traveller; see the English edition of his Travels, v. 2. 174. and 181.

M. tanacetifolia. Tansey-leaved Hawthorn. Sm. Exot. Bot. v. 2. 51. t. 85. Ait. Hort. Kew. ed. 2. v. 3. 206. Andr. Repof. t. 591. (*M. orientalis*, *tanacetifolia villosa*, magno fructu pentagono e viridi flavescente; Tourn. Cor. 44. Voy. v. 2. 171. t. 172.)—Thorny. Leaves obtuse, pinnatifid, cut; downy on both sides. Styles five. Bractæas permanent.—Native of all the high mountains of Greece. A very desirable shrub for plantations, on account of its large highly-scented corymbose flowers, and yellow fruit, which resembles a small apple, and has the scent of one. By culture and grafting, it promises to become an acquisition to our tables. From the description in Dioscorides of his *μεισμαλον*, “a spinous tree with leaves like hawthorn, fruit like a little apple, sweet, with three hard seeds,” this should seem, as the number of seeds varies, to be the present; while his *μεισμαλον επιρον*, from Italy, “a tree like an apple tree, but with smaller leaves, and a round eatable fruit, with a broad depression, slightly astringent, and long in ripening,” can only be our common garden *Mespilus germanica*. Tournefort did not observe the thorns of the *M. tanacetifolia*, but he describes the eagerness with which his Armenian companions collected and ate the fruit, and he mentions the trees as of the size of oaks. He notices also our preceding *M. odoratissima*, as distinguished by its red fruit, varying in size, rather acid, and more agreeable than that of the *tanacetifolia*.

M. Azarolus. Neapolitan Medlar or Azarole. (*M. Aronia veterum*; Bauh. Hist. v. 1. 67. *M. prima*; Matth. Valgr. v. 1. 229. *M. n. 13*; Duham. Arb. v. 2. 16. t. 5. (*Cratægus Azarolus*; Linn. Sp. Pl. 683. Willd. n. 19. Ait. n. 14. Andr. Repof. t. 579.)—Somewhat thorny. Leaves obtuse, nearly smooth, in three or five entire-edged segments. Styles two.—Native of Italy, the south of France, and Carniola; rare in our gardens. It is

akin to the two last, but the leaves are smoother, entire at the edges, and the styles but two; though Scopoli says the fruit has five cells, which caused him to refer this species to *Pyrus*. We have no doubt that the number of the styles and cells is the same, and therefore this perhaps affords another example of the variableness of that number. The fruit is said to be austere in flavour, and hence Matthioli found a difference between his plant and the *μεισμαλον* of Dioscorides, which, as they had never seen the true one, he, and other botanists of his time, took this to be; nor were they very wide of the mark. When cultivated, the Azarole is spoken of as an agreeable fruit. We have never heard of its ripening in England, nor does the tree often blossom.—The old wooden cut of Matthioli, used again by Duhamel, is by far the best representation of this species; that in Ger. em. 1454 is more like the *Oxyacantha*.

M. germanica. Common, or Dutch Medlar. Linn. Sp. Pl. 684. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 1523. Pallas Ross. v. 1. p. 1. 29. t. 13. f. 1. (*M. altera*; Matth. Valgr. v. 1. 230. *M. sativa*; Ger. em. 1453.)—Thorns none. Leaves lanceolate, somewhat downy. Flowers solitary, sessile, terminal. Styles five.—Native of the warmer parts of Europe. Common in gardens, for the sake of its fruit, which is not eatable till it becomes quite mellow, and is almost as variable in size and flavour as any other. The leaves are a span long, most downy beneath, dark green above, a little serrated at the top. Flowers the largest of the genus, white, as broad as a crown piece. Fruit broad, depressed, brown when ripe.

M. grandiflora. Large-flowered Barren Medlar. Sm. Exot. Bot. v. 1. 33. t. 18. Ait. n. 5.—Thorns none. Leaves elliptic-oblong, slightly downy, unequally serrated. Flowers nearly solitary, terminal. Styles three.—Cultivated in Chelsea garden by Mr. J. Fairbairn, who is unacquainted with its native country. The tree much resembles the *M. germanica*, but the leaves are strongly serrated, and more elliptical. Flowers white, scentless, almost as big as those of the *germanica*, and much exceeding those of all the other species, *tanacetifolia* approaching them most nearly in this respect. They grow mostly solitary, rarely two together, at the ends of small lateral branches. Styles never more than three; often but two. Fruit small, reddish, with little pulp, rarely perfected in England.

M. japonica. Japan Medlar, or Lequat. Thunb. Jap. 206. Willd. n. 2. Ait. n. 2. Banks. Ic. Kæmpf. t. 18. Vent. Malmaif. t. 19. (Bywa; Kæmpf. Amœn. 800.)—Leaves obovate, acute, serrated; downy beneath. Clusters aggregate, terminal. Styles five.—Native of Japan; hardy with us, flowering in spring and autumn, and often ripening its fruit, which is globular, an inch in diameter, yellow, not bad eating. Thunberg says this is a very large tree in its native country. The leaves are rigid, a foot long, evergreen, smooth, and shining on the upper side, white or rusty beneath. Flowers very numerous, white, on rusty stalks.—This plant remained for some time in our stores without flowering, and was taken for a *Volkameria*.

MESPILUS, in Gardening, comprehends plants of the deciduous tree flowering shrubby and evergreen kinds, of which the species cultivated are; the Dutch or common medlar (*M. germanica*); the arbutus-leaved mespilus (*M. arbutifolia*); the alpine mespilus (*M. amelanchier*); the baitard quince, or mespilus (*M. chamæ-mespilus*); the snowy mespilus (*M. canadensis*); the dwarf mespilus (*M. cotoneaster*); the quince-leaved mespilus (*M. tomentosa*); and the evergreen thorn or mespilus (*M. pyracantha*).

In the first sort it is observed, that the wild tree differs from the cultivated one in having more slender, strigose, thorny

thorny branches, and much smaller leaves, flowers, and fruits.

And there are two varieties, the narrow-leaved and the broad-leaved; the first growing to a large tree, rising with a straighter stem, and the branches growing more upright than those of the Dutch medlar; the leaves are narrower and not serrate, the flowers smaller, and the fruit shaped like a pear. This is a native of Sicily.

The latter never rises with an upright trunk, but sends out crooked deformed branches at a small height from the ground, the leaves are very large, entire, and downy on their under side: the flowers very large, as also the fruit, which is rounder, and approaches nearer to the shape of an apple: this, bearing the largest fruit, is now generally cultivated; but there is one with smaller fruit, called the Nottingham medlar, of a much quicker and more poignant taste. There are also other varieties in the fruit, which are now little attended to by the cultivators of this fruit.

The second species varies with red, with black, and with white fruit.

Method of Culture.—They are all easily raised by seeds, layers, grafting and budding; but it is the best practice to raise the medlar kinds principally by grafting or budding, in order to continue the sorts.

When they are raised in the first method, the seeds should be sown in autumn, in a bed of common earth, as they usually lie a year, or more, before they germinate, as in the haw and holly-berries, &c.

As soon as the plants appear they should be watered frequently in dry weather; and in the autumn or spring following, the largest be thinned out and planted in nursery rows, two feet by one asunder; and in another year all the rest may be set out in the same manner; and in three or four years they will be proper for being planted out in the garden or shrubbery grounds.

But in the second mode the young branches should be laid down in the autumn in the common method; and they will be properly rooted by the autumn following, when they should be planted out in nursery-rows in the same way as the seedlings.

And the two last methods should be performed on the stems or stalks of the larger medlar kinds, or sometimes upon those of the white thorn, raised from seed as above; but the pear-stock is to be preferred for the common medlars, when intended as fruit trees. The operations are performed in the usual way, low in the stocks to form dwarfs; and for half or full standards, training the first shoot for a stem, or the stock may be let form a stem, and then be wrought at from about three or four to five or six feet in height. See **BEDDING and GRAFTING.**

Those plants intended for fruit-trees, whether dwarfs, half or full standards, in training, should, for dwarfs, have the first shoots from the graft or bud headed down short in spring, if necessary, in order to force out a proper supply of bottom branches, which must be trained as other dwarf fruit-trees, either for standard-dwarfs or espaliers. When for half or full standards, and wrought low in the stocks, the first shoot of each should be trained for a stem, topping it afterwards at the proper height to force out lateral shoots to form the head; but when wrought high in the stock, the first shoots may either be shortened or suffered to grow, as may seem most proper, according to the natural disposition of the leading shoot, in respect to its furnishing lateral branches. After this training for the first year or two, to give the trees their first proper formation, there should not be any further general shortening of the branches, practising it only occasionally to particular shoots, to procure more wood, when

necessary, to fill vacancies, to reduce any irregular growth, or to cut off dead parts. But in other respects the branches should be principally left at full length, and the standards left to assume nearly their own natural way of branching. See **PRUNING and TRAINING.**

These plants are all hardy, succeeding in any common soil and situation.

It may be noticed that the first sort and varieties are cultivated as fruit trees, principally as standards, but sometimes as espaliers for variety; and are often introduced into the shrubbery plantations. All the other species are proper for ornament in shrubbery or other plantations, where they effect a fine variety by their different foliage and flowers, as well as their fruit in autumn and winter, which remains long on the branches. They should be disposed—the deciduous kinds principally in assemblage with others of that sort, and the ever-green kind also chiefly with those of their own kind, arranging each sort according to its height of growth; but the last sort, being agreeably ornamental, both as an ever-green and in its numerous clusters of fine red berries in winter, should have a conspicuous situation. From its being of a rather slender growth, it is however commonly trained against walls or the fronts of houses, for the support of its flexible branches, as well as to exhibit its berries more ornamentally. It may however be trained as a standard shrub, like the other sorts, in the open shrubbery; in which case it should be generally trained with short single stems, and be permitted to branch out upwards into spreading heads, which have a good effect.

MESS, in *Sea Language*, denotes a particular company of the officers or crew of a ship, who eat, drink, and associate together, whence *mess-mate*, denoting one of these with respect to another.

Mess, in *Military Language*. The principal military mess in Great Britain is kept, and provided for in the extraordinaries of the army, at the Horse-guards. This mess consists of the field officers in waiting, of the life and foot guards, officers in the king's life and foot guards; officer of the queen's guard and tilt picket, and adjutant of the battalion of foot guards that mounts. The colonel of the foot guards is allowed to invite three visitors. Two breakfasts are likewise provided every morning, one for the guard coming on, and one for the guard going off, together with a supper every night.

MESSA, in *Geography*, a town of Morocco, situated on the river Sus, not far from the foot of the Atlas. It is large, divided into three parts, and surrounded with walls. In its vicinity is a mosque, containing the bones of a whale, which the superstitious inhabitants consider as those of the whale which swallowed Jonah; 165 miles S.W. of Morocco. N. lat. 29 56'.

MESSA, *Messe*, plural. Ital.; *Messe*, *Messes*, plu. Fr., the title given in the Romish liturgy to the high mass in music, consisting of the *Kyrie*, *Cbrijle*, *Credo*, *Sandus*, and *Agnus Dei*. These portions of the church service have been set in the style of our cathedral services by every great composer in Catholic countries, ever since the laws of counterpoint were settled, that is, from the latter end of the 15th century to the present time. For common occasions the mass is set for the choral establishment, accompanied only by the organ: in these, solo verses are seldom introduced; but for festivals, in Italy, the composition is more elaborate and secular, when an additional band and singers of the first class are employed. Alessandro Scarlatti, Leo, Pergolesi, Durante, Perez, Jomelli, Sacchini, &c. have composed masses, which will be regarded by true judges of composition as master-pieces of the art.

MESSA Bassa, silent mass whispered by the priest during a musical performance.

MESSE de Capella, in the *Italian Music*, is used for masses sung by their grand chorus. In these, various fugues, double counterpoints, and other ornaments are used.

MESSE Concertati, masses wherein the parts reciting are intermixed with chorusses.

MESSALA, M. VALERIUS CORVINUS, in *Biography*, an illustrious Roman, of an ancient and noble family, who distinguished himself in youth by his eloquence and patriotism, and joined the republican army under Brutus and Cassius against the triumvirs. He is described in very high terms by Cicero, in a letter to Brutus, as being almost, or altogether unequalled for integrity, constancy, and the affection which he displayed for the commonwealth. Of his eloquence, Quintilian says, it is splendid, fair, and bearing the stamp of his nobility. At the battle of Philippi he had a distinguished command, and with his legion was the first that turned the left wing commanded by Octavianus Cæsar. After the death of the two republican chiefs, he made his peace with the victor, and, according to one of the historians of Rome, there was no circumstance of the victory more pleasing to Cæsar than the preservation of Messala, nor did any man ever give proof of greater attachment and gratitude than Messala towards Cæsar. Yet, to his honour, it is asserted, that he never, and on no occasion, was backward in shewing his regard to the memory of his earlier friends, and his decided preference of their cause. When he recommended Strato to Cæsar, he said, with tears flowing from his eyes, "this, sir, is the man who performed the last kind office for my beloved friend Brutus;" and at another time, when Cæsar reminded him that he had been no less zealous for him at Actium, than *against* him at Philippi, he answered, "I always espoused the most just side of every question." In the year 31 B.C. he was the emperor's colleague in the consulate, and was sent as his legate into Asia a year or two afterwards. In 37 he obtained a triumph over the Aquitanians; after this, he for a short time held the office of prefect, which he resigned, finding it ill adapted to his habits. He was addicted to literary pursuits, and was a patron of literary persons, particularly of Tibullus, who commemorates him in his elegies, and has left an express panegyric upon him. In old age he composed a work "De Familiis Romanis," cited by Pliny. At the age of seventy, about two years prior to his decease, the faculties of his mind underwent a total decay, and his memory so completely failed him, that he forgot his own name. Plutarch.

MESSALIANS. See **EUCHITES**.

MESSALINA, VALERIA, in *Biography*, a daughter of Messala Barbatus, married the emperor Claudius, and disgraced herself by her cruelties and scandalous incontinence. Her husband's palace was not the only seat of her lasciviousness, but she even prostituted herself in the most public manner. Her extravagancies at last irritated Claudius so much, that he was obliged to summon her to answer to all the accusations which were brought against her, upon which she attempted to destroy herself, and when her courage failed, one of the tribunes dispatched her with his sword in the year 48. The satirist, in speaking of her, says,

"Et lassata viris, necdum satiata, recessit."

There was another person of this name called also Statilia, who was descended of a consular family, and married the consul Atticus Vistinus, whom Nero murdered. She received with tokens of tenderness her husband's murderer, and married him. She had married four husbands before she came

to the imperial throne; and after the death of Nero retired to literary pursuits and peaceful occupations. Otho, after this, paid his addresses to her, but before the consummation of marriage he destroyed himself. In his dying moments he wrote her a pathetic and very consolatory letter.

MESSANA, in *Ancient Geography*. See **MESSINA**.

MESSAPIA, a country of Italy, which, though scantily watered, was covered with trees and pastures. Its principal towns were Brundisium, Rudia, Lupia, Hydruntum, Callipolis, and Tarentum. It was also called Iapygia.

MESSAR, in *Geography*, a small island in the Red sea. N. lat. 17° 26'.

MESSARA, a province of the island of Crete, which lies south to that of Candia, and which is the most fertile, and the most agreeable of the island; it has, among others, a very beautiful plain, six leagues in extent, in which are found an abundance of wheat, barley, flax, cotton, and a variety of fruits. It is crossed by a small river called at this day "Malognithi," and formerly known by the name of "Lethe." It passes by the side of the ruins of Gortyna, and empties itself into the sea facing the Paximadi islands. The wheat of Messara yields a great quantity of flour, which makes excellent bread; it is conveyed on the backs of asses to Candia, Retimo, and Canea; while the inhabitants themselves live all the year on a very coarse barley bread. Messara is reckoned the granary of Crete: its wheat is one of the best in Turkey. The Turks are here more numerous than the Greeks.

MESSASAGUES, or **MISSASAGAS**, a tribe of Indians in America, on a river of this name, which discharges itself into the N.W. part of lake Huron. This tribe, a few years ago, numbered 500 warriors, but now 80.

MES-SEELAH, a town of Africa, in the kingdom of Algiers; 80 miles S.S.E. of Dellys.

MESSEGNA, a town of Naples, in Otranto; 21 miles N.W. of Lecce.

MESSENE, MAURA-MATHI, a town of European Turkey, in the Morea, on a river which runs into the gulf of Coron; 30 miles N.W. of Mistra. This was the ancient Messene or Mycene, the capital of Messenia, N. of Æchalia and S. of Ithome. It was founded by Epaminondas, and peopled about the year 369 B.C. It was a large and magnificent town, embellished by the temples of Neptune, Venus, Ceres, Lucina, &c. by a variety of statues, &c. Strabo represents it as one of the strongest places among the ancients, and compares it with Corinth, being defended by a fortress built on mount Ithome, as the latter city was by a double citadel. On the path which led to this citadel was a fountain called Clepsydra, signifying concealed water. It was pretended, that the nymphs which reared Jupiter came to bathe secretly in this fountain, whence it derived its name. N. lat. 37° 15'. E. long. 21°.

MESSENE, a kind of island, formed by the Euphrates on the W. and the Tigris on the E. It had, to the north, the wall of Semiramis, and to the south a canal, which separated it from Babylonia, and the Seleucide territory.

MESSENGERS, in the *English Polity*, are carriers of letters and messages; or, more particularly, certain officers, chiefly employed under the direction of the secretaries of state, and always in readiness to be sent with all manner of dispatches, foreign and domestic.

They are always employed with the secretaries warrants to take up persons for high treason, or other offences against the state, which do not so properly fall under the cognizance of the common law; and, perhaps, are not properly to be divulged in the ordinary course of justice. The prisoners they apprehend are usually kept at their own houses, for each

each of whom they are allowed by the government a compensation. Although it is the constant practice to make commitments to messengers, it is said that it shall be intended only in order to the carrying of offenders to gaol. (1 Salk. 347. 4 Hawk. P. C. c. 16. § 9.) An offender may be committed to a messenger, in order to be examined before he is committed to prison; and though such commitment to a messenger is irregular, it is not void. (Skin. 599.) When they are dispatched abroad, they have an allowance for their journey.

MESSENGERS of the Exchequer, are officers attending the exchequer, in the nature of pursuivants; their business is to attend the chancellor and auditor, &c. and to carry their letters, precepts, &c.

MESSENGER of the Press, a person, who, by order of the court, searches printing-houses, booksellers' shops, &c. in order to discover seditious books, &c.

There are also other officers distinguished by this appellation; as the messenger of the lord chancellor, of the privy council, of the great wardrobe, the two messengers of the yeomen of the guards, messenger to the gentlemen pensioners, four messengers to the board of commissioners for India, messenger of the board of longitude, nine messengers of the navy pay-office, four messengers of the victualling office, messenger of the war-office, three messengers of the army pay-office, messengers of the ordnance-office, messengers of the office for auditing the public accounts, messengers of the custom-house, of the stamp-office, of the general post-office, seven messengers to the commissioners of bankruptcy, &c.

MESSENGER, in *Mechanics*, the endless rope employed in the capstan; which see.

MESSENA, in *Ancient Geography*, a country of Greece, which occupied the S. E. part of the Peloponnesus; it was 13 or 14 leagues in its largest dimension, and 10 from S. to N. It was bounded, on the north, by the Elide and Arcadia; on the E. by Laconia, on the S. in great measure by the Messenian gulf, and on the W. by a part of the Ionian sea. This country was mountainous and unfertile: its principal river was the Pamissus, and Messene was its capital. It is said by Pausanias to have derived its name from a princess, called Messene, a native of Argos, daughter of Triopas, and granddaughter of Phorbes. She married Polycaon, the youngest son of Lelex, and persuaded her husband to take possession of a country situated to the W. of Laconia, and inhabited by a savage race. Having done this, he gave to the country the name of his wife, and built in it many towns. When the family of Polycaon became extinct; it passed under the dominion of several successive sovereigns; till at length, after the battle of Leuctra, Epaminondas recalled the descendants of the Messenians, and built Messene.

MESSERAG, in *Geography*, a town of the duchy of Courland; 38 miles E. of Goldingen.

MESSEROF, a town of Poland, in the palatinate of Braclaw; 40 miles N. W. of Braclaw.

MESSERSBURG, a post-town in Franklin county, Pennsylvania; 168 miles W. by S. from Philadelphia.

MESSERSCHMIDIA, in *Botany*, received its name from Linnæus, in honour of Daniel Theophilus Messerschmid, a German botanist who was sent out by the Russian government to explore the natural history of Siberia, prior to the expedition under Pallas. He was born in the year 1685, and died about the age of 30. His researches were never published, and he is only known as an author, by a paper which he left, giving an account of the "*Camelus Bactrianus, binis in dorso tuberibus.*" This was edited by John Amman, and published in the 14th vol. of the *Tran-*

actions of the Petersburg Academy. Linn. Mant. 5. Schieb. 103. Willd. Sp. Pl. v. 1. 789. Mart. Mill. Dict. v. 3. Ait Hort. Kew. ed. 2 v. 1. 323. Juss. Gen. 129. Lamarck. Illustr. t. 95. Gærtn. t. 109.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asperifolia*, Linn. *Borraginea*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, erect, permanent, deeply cloven into five, somewhat linear segments. Cor. of one petal, funnel-shaped, tube cylindrical, of a rosette texture, longer than the calyx, globose at the base; limb five-cleft, folded, membranous at the sides; throat naked. Stam. Filaments five, minute, in the lower part of the tube; anthers awl-shaped, erect, within the middle of the tube. Pist. Germin. superior, nearly ovate; style cylindrical, very short, permanent, stigma capitate, ovate. Berry dry, corky, of a roundish cylindrical form, abrupt at the summit, which is surrounded with four, obtuse teeth; when ripe it separates into two parts. Seeds two in each division of the berry, oblong, bony, incurved, rounded on the outside, angular within.

Ess. Ch. Corolla funnel-shaped, with a naked throat. Berry corky, divisible into two parts, with two seeds in each.

1. *M. fruticosus*. Linn. Suppl. 132. Syst. Veg. ed. 14. 190.—Stem shrubby. Leaves on stalks. Corolla salver-shaped—A native of the Canary islands, especially in the northern parts of Teneriffe, where it was found by Mr. Francis Masson, who introduced it into Kew gardens in 1779, where it flowers from June to October.—The stem of this shrub is lofty, rugged, rough with hairs, branched; branches panicled at the top. Leaves alternate, on long stalks, lanceolate, entire, veined, hairy. Spikes of flowers compound, directed one way, forked, at the ends of the twigs on the upper part of the stem. Linnæus observes that this species has the corolla of *Tournefortia*, to which the genus is nearly allied, but its fruit is that of a *Messerschmidia*. It is very similar to the following species *M. Arguzia*, differing only in its shrubby stem, stalked leaves, shorter calyx, and smaller, salver-shaped corolla, with a flat limb.

Professor Martyn has quoted a figure of this species as being in the second volume of *L'Heritier's Stirpes Novæ*, on the authority of the editor of the first edition of *Hortus Kewensis*; and we know that this quotation, in the latter work, arose from a communication of L'Heritier to Mr. Dryander. The second volume however of *Stirpes Novæ* never appeared, and therefore Mr. Dryander repented of having quoted it, determining never to refer to an unpublished figure again; accordingly the reference is suppressed in the second edition of *Hortus Kewensis*.

2. *M. Arguzia*. Linn. Mant. 42. Suppl. 132. (Messerschmidia; Hort. Upl. 36. Gmel. Sib. v. 4. 77. Arguzia; Amman. Ruth. 29. Tournefortia sibirica; Linn. Sp. Pl. 202.)—Stem herbaceous. Leaves sessile. Corolla funnel-shaped. A native of dry, gravelly, sunny places in Siberia. Root creeping. Stem erect, three or four inches high. Branches alternate, sterile. Leaves alternate, sessile, ovate-oblong, veined, downy, whitish. Corymbs or tufts of flowers frequently two. Calyx shorter than the tube of the corolla, which is white, larger than in the preceding, with the throat naked and pervious; the limb plaited and its sides membranous.

3. *M. cancellata*. Willd. n. 3. D'Alffo. Synop. n. 162. t. 1. f. 2. (Cerinthe foliis lanceolatis, caulibus ramosis, floribus vix calyceem superantibus, fructibus cancellatis; Querc. Hisp. v. 4. 145. t. 25.)—Leaves sessile, linear, obtuse, hisp. Capsules reticulated.—A native of Spain.—We adopt

this on the authority of Willdenow, without being able to consult his references. "Plant a foot high. Root fibrous, reddish. Stems hairy, branched. Radical-leaves lanceolate, rather obtuse, hispid, those of the stem similar, but narrower. Flowers on stalks, in clusters, of a blue colour."—D'Affo observes that one seed in each division of the berry is abortive.

MESSI, in *Geography*, a town of Asiatic Turkey, in Natolia, built on the site of *Halicarnassus*, which see; 50 miles S.W. of Mogla. N. lat. 37° 46'. E. long. 27° 22'.

MESSIAH, a term signifying *anointed*, or *sacred*; and, in that sense, applied to kings and priests; but, particularly, by way of eminence, to Jesus Christ, the saviour promised by the prophets of the old Jewish law.

The word comes from the Hebrew מָשַׁח, *maschuach*, *anointed*, of the verb מָשַׁח, *maschach*, to anoint; whence

Jesus Christ claims the title on a manifold account; 1, as having been anointed king of kings from all ages; 2, as chief of the prophets; 3, as high priest of the law of grace, or priest for ever after the order of Melchizedech.

The prophecies in the Old Testament, which relate to the coming of the Messiah, are very numerous; some of which may be found in Gen. iii. 15. xlix. 10. Isaiah, vii. 14. c. xi. c. lii. liii. which the Targum of Jonathan interprets of the Messiah. Dan. ix. 25. Micah, iv. 1—5. c. v. 2—4. Haggai, ii. 6, 9. Zechi. iii. 8—10. vi. 12, 13. ix. 9—12. Mal. iii. 1—4. iv. 2—6, &c.

It has been also urged, that there are some remarkable passages in Josephus, Philo, Tacitus, Suetonius, and Celsus, which shew that the expectation of the Messiah, agreeable to the scripture prophecies, prevailed in some degree among the heathen nations; and many have supposed that there is some reference of this kind in the fourth eclogue of Virgil. We shall only add farther, that the best Christian writers lay little stress on the prophecy of Christ cited by Abulpharagius, out of the books of Zerduch or Zoroaster, nor on the pretended prophecy of Confucius, among the Chinese; nor on those of the Sibylline oracles, among the Romans.

The Jews still wait for the coming of the Messiah, being infatuated with the notion of a temporal Messiah, that is to be a mighty conqueror, and to subdue all the world. Most of the modern rabbins, according to Buxtorf, believe that the Messiah is already come, but that he keeps himself concealed, and will not manifest himself because of the sins of the Jews. Some of the Jews, however, in order to reconcile those prophecies that seem to contradict each other, as to the character and condition of the Messiah, have had recourse to the hypothesis of two Messiahs, who are yet to succeed each other; one in a state of humiliation and suffering; the other of glory, splendor, and power. The first, they say, is to proceed from the tribe of Ephraim, who is to fight against Gog, and to be slain by Annillus, Zech. xii. 10. The second is to be of the tribe of Judah, and lineage of David, who is to conquer and kill Annillus, and restore the kingdom of Israel, reigning over it in the highest glory and felicity.

Jesus Christ asserts himself to be the Messiah. In St. John iv. 25. the Samaritan woman says to Jesus, "I know that when the Messiah comes, who is called the Christ, he will tell us all things. Jesus answered her, I that spake to thee am he." There are several impostors, who have endeavoured to pass for Messiahs, as Christ himself predicted. J. Lent, a Dutchman, has written a history of false Messiahs, "De Pseudomesias." The first he mentions was one Barcochab, who appeared under the empire of Adrian. The last was

rabbi Mordecai, who began to be talked of in 1682. A little before him; viz. in 1666, appeared Sabbethai Sebi, who was taken by the Turks, and turned Mahometan.

MESSIEURS, a French title of honour, or civility, lately introduced into our language; being the plural of *monsieur*, and equivalent to the English sirs, or gentlemen.

The French lawyers always begin their pleadings and harangues with *messieurs*; which word is also frequently repeated in the course of their speeches; on which occasion it answers to our English word *gentlemen*.

The French say, *Messieurs du parlement; du conseil; des comptes, &c.*

MESSILLONES, or MUSCLE-Bay, in *Geography*, a bay on the coast of Chili or Peru, in South America; 8 leagues N. by E. of Morrenas bay, and 5 S. by W. of Atacama. It forms part of Atacama bay, and at its entrance, or the anchoring place, ships may ride in 15 fathoms, clean ground, and secured from most winds.

MESSINA, a city and sea-port of Sicily, in the valley of Demona, the see of an archbishop, situated on the E. coast towards the narrow sea, called "The Straits of Messina," formerly called "Zanche," which name it received, according to Thucydides, from the form of its harbour, that resembles a hook. This author supposes that the city was founded by the pirates of Cuma. Other writers trace its origin to a higher antiquity, and date it 530 years before the siege of Troy, and 964 years before Romulus laid the foundation of Rome. They add, that when the inhabitants were molested by the pirates of Cuma, they sought the assistance of the Messenians, a people of Greece, who hastening to their succour, cleared their coasts, entered into an alliance with them, and hence the city was called by the Greeks "Messene," and by the Latins "Messana." Pausanias says, that Anaxilas, tyrant of Rhegium, having formed an alliance with the Messenians of Greece against the Zancleans, with their assistance took possession of the city, which, in compliment to them, he called "Messene." This event is said to have taken place in the year of Rome 94. This city was afterwards seized by the Mamertini, and being made their capital, it became one of the most wealthy and powerful cities of Sicily. The Mamertini transferred it to the Romans, and from them it was taken, in the first Punic war, by the Carthaginians. Under the Romans it enjoyed a long interval of peace, and was spared by the rapacious Verres. In the civil wars it took part with Sextus Pompeius. After the fall of the Roman empire it was for some time in the possession of the Saracens: and, in 1060, was taken by Roger, count of Calabria, who also assumed the name of the count of Sicily. In 1139, Richard I. king of England, made himself master of it in his way to the Holy Land. It was afterwards betrayed to Louis XI., king of France, who was compelled to surrender it. The harbour of this city has been much admired, and the quay is decorated with a range of buildings, nearly uniform in its whole length, and interrupted only by a number of arches, which serve as entrances into the corresponding streets that terminate upon it. At the bottom of the port is the king's palace, the residence of the governor of the city, before whose door the vessels of the royal navy lie at anchor. Near this is a covered walk, which leads to the citadel, which is almost impregnable, and cannot be attacked by sea, on account of the currents and the difficulty of anchorage, nor is it overlooked on the land side, whilst it commands the city and harbour. This was built by Charles XI. after a revolt of the inhabitants. There is a communication by a covered way, and a wide subterranean passage formed under the jettee, between the citadel and two forts;.

forts; one that of the Lantern, which points out the channel in the Calabrian coast, and that of St. Salvador, which defends the entrance of the port. It seems as if nature had designed even the whirlpools of Scylla and Charybdis to serve as guards to this superb port; which is capable of containing all the ships of Europe, and where vessels arrive at the very door of the merchant, finding any required depth of water, and needing not to move an anchor, if it were not for the violence of the Sirocco, the only wind to which it is exposed, and by which the ships are in danger of being driven out to sea. In the middle of the haven are a light-house and lazaretto. Within the city are handsome streets, elegant marble fountains, equestrian and pedestrian statues of bronze, large and handsome churches, vast convents, tolerably well built hotels, a magnificent general hospital, called "La Loggia," another large and rich hospital, and near it a well-regulated as well as spacious Lombard house. The population formerly corresponded with these appearances; but the plague of 1743 and 1744 reduced it from 100,000 to 30,000. In 1780 and 1782 it suffered much from an earthquake. The calamities which this city has suffered have not only diminished its population, but occasioned the decay of many houses and the desertion of their occupiers, as well as the decline of their trade, which, however, is still considerable. In August an annual fair is held, at which great quantities of foreign goods are exposed to sale. The air at Messina is temperate, being continually freshened by the sea, purified by the mountains, agitated by the currents, and moderated by the shade and shelter. So that, as De Non says, it is rendered one of the healthiest and most agreeable habitations of the whole world. Messina claims the prerogative of being styled the capital of the kingdom, though Palermo disputes the precedence with it; 104 miles E. of Palermo. N. lat. 38° 10'. E. long. 15° 40'.

MESSINES, a town of France, in the department of the Lvs, and chief place of a canton, in the district of Ypres. The place contains 3155, and the canton 17,956 inhabitants, on a territory of 167½ kilometres, in 8 communes.

MESSING, a town of Bavaria, in the bishopric of Aichstatt; 14 miles N.N.E. of Aichstatt.

MESSIS, a town of Asiatic Turkey, in Caramania; 15 miles E.S.E. of Adana.

MESSUAGE, **MESSUAGIUM**, in *Law*, a dwelling-house, with some land adjoining, assigned for its use.

By the name of messuage may a garden, shop, mill, cottage, chamber, cellar, or the like, pass.

In Scotland, messuage denotes what we call the *manor-house*, viz. the principal dwelling-house within the barony.

MESSUBY, in *Geography*, a town of Sweden, in Tavastland; 34 miles N.W. of Tavasthus.

MESTA, in *Geography*, a town and cape on the W. coast of the island of Scio. N. lat. 38° 25'. E. long. 30° 54'.

MESTA, a Spanish term, which, in its general acceptation, signifies a mixture of two or more sorts of grain, and is equivalent to the English word "Mellin," denotes, in a more restricted sense, the union of the flocks belonging to several different proprietors into one collective body, which does not strictly attach to any country, but travels backward and forward twice in the year, passing part of it at one place, and part in another. This collection is formed by an association of proprietors, consisting of the nobles, persons in power, members of rich monasteries and ecclesiastical chapters, who feed their flocks on the waste lands, as is done on the commons in England. These flocks they call *Merinos*, or *transhumantes*.

This custom, first introduced by circumstantial necessity, in process of time was converted into a claim, which long possession has now changed into a prescriptive right. It rests at present upon the support of those laws and ordinances which have favoured, protected, and perpetuated the usurpation.

The origin of this custom must be referred to the era in which the great plague ravaged Spain, and destroyed two-thirds of the population. The few persons who survived that destructive scourge took possession of the lands which had been vacated by the death of their former occupiers. These they united with their own for the purpose of forming large properties; but not possessing sufficient means for the cultivation of such extensive domains, they were obliged to convert nearly the whole into pasture, and confine their attention principally to the care and increase of their flocks. Hence has arisen the vast quantity of pasture lands which occupy the greater part of Estramadura, the kingdom of Leon, and other provinces. To this cause, among others, may be attributed the prodigious quantity of uncultivated lands discoverable through the whole kingdom; and hence so many proprietors, who possess extensive tracts of territory, yet have no titles to their estates, and are therefore denominated *Duñes voceros*.

The flocks which, when united, form the Mesta, usually consist of about ten thousand sheep in each. Every flock is conducted by an officer, called a *mayoral*, who superintends the shepherds, and directs the route. It is essential that he should be an active man, well acquainted with the kinds of pasturage, the nature of sheep, and methods of treatment. The mayoral is allowed a horse and one hundred *doublons*, or fifteen hundred livres tournois (thirty pounds eight shillings sterling) *per annum*. Placed under him are fifty shepherds, who are divided into four classes. The wages amount to one hundred and fifty reals, or thirty-seven livres ten sols (one pound eleven shillings and three-pence) *per month*, for the first class; one hundred reals, or twenty-five livres (one pound and eleven-pence) for the second; sixty reals, or fifteen livres (twelve shillings and ten-pence) for the third; and forty reals, or ten livres (eight shillings and four-pence) for the fourth: exclusive of these wages, each is allowed a daily ration of bread, weighing two pounds. They receive individually twelve reals, or three livres (two shillings and six-pence) for travelling expences, when they commence their journey in the month of April or May; and the like sum on their return in October. To each shepherd is granted the privilege also of keeping a few sheep and goats, but the wool and hair belong to the proprietor of the flock; he takes himself the increase, the flesh, and the milk; but he cannot take any part of these away. The number of persons thus employed in the care of the whole of the flocks which compose the Mesta, are about forty-five or fifty thousand. The dogs are also numerous, fifty being the allowance to each flock.

The number of sheep which are thus made to migrate has varied at different periods. It very much decreased during the seventeenth century. It was again increased in the eighteenth. In the sixteenth the enumeration comprised seven millions. At the commencement of the seventeenth, in the reign of Philip III., they were reduced to two millions five hundred thousand. Urtaria states the number in his time, about the end of the same century, at four millions; they amount at present to near five.

The flocks are put in motion the latter end of April, or beginning of May, leaving the plains of Estramadura, Andalusia, the kingdom of Leon, and Old and New Castile, where they usually winter; they repair to the mountains of

the two latter provinces, and those of Biscay, Navarre, and Aragon. The mountainous districts most frequented by these flocks in New Castile are those of Cuenca; and in Old Castile, those of Segovia, Soria, and Buytrago. The sheep, while feeding on the mountains, have occasionally administered to them small quantities of salt. It is laid upon flat stones, to which the flocks are driven, and permitted to eat what quantity they please. During the days the salt is administered, the sheep are not allowed to depasture on a calcareous soil, but are moved to argillaceous lands, where they feed voraciously.

At the end of July the ewes are put to the rams, after separation has been made of those already with lamb. Six or seven rams are considered sufficient for one hundred ewes.

In September the sheep are ochred, their backs and loins being rubbed with red ochre, or ruddle, dissolved in water. This practice is founded upon an ancient custom, the reason of which is not clearly ascertained. Some suppose, that the ochre uniting with the oleaginous matter of the fleece, forms a kind of varnish, which defends the animal from the inclemency of the weather. Others think the ponderosity of this earth prevents the wool growing too thick and long in the staple. But the more eligible opinion is, that the earth absorbs the superabundant perspiration, which would otherwise render the wool both harsh and coarse.

Toward the end of the same month the flocks recommence their march. Descending from the mountains, they travel towards the warmer parts of the country, and again repair to the plains of Leon, Estramadura, and Andalusia. The sheep are generally conducted to the same pastures they had grazed the preceding year, and where most of them had been yeaned: there they are kept during the winter.

Sheep-shearing commences the beginning of May, and it is performed while the sheep are on their summer journey, in large buildings called *Esfquileos*. These, which are placed upon the road, are capable of containing forty, fifty, and some sixty thousand sheep. They are erected in various places; but the principal are in the environs of Segovia, and the most celebrated is that of *Iurviaca*. The shearing is preceded by a pompous preparation, conducted in due form, and the interval is considered a time of feasting and recreation. One hundred and twenty-five men are usually employed for shearing a thousand ewes, and two hundred for a thousand wethers. Each sheep affords four kinds of wool, more or less fine according to the parts of the animal whence it is taken. The ewes produce the finest fleeces, and the wethers the heaviest: three wether fleeces ordinarily weigh on the average twenty-five pounds; but it will take five ewe fleeces to amount to the same weight.

The journey which the flocks make in their peregrinations is regulated by particular laws, and immemorial customs. The sheep pass unmolested over the pastures, belonging to the villages, and the commons which lie in their road, and have a right to feed on them. They are not, however, allowed to pass over cultivated lands; but the proprietors of such lands are obliged to leave for them a path ninety *varas*, or about forty toises (eighty-four yards) in breadth. When they traverse the commonable pastures, they seldom travel more than two leagues, or five and a half miles a day; but when they walk in close order over the cultivated fields, often more than six, or near seventeen miles. The whole of their journey is usually an extent of one hundred and twenty, thirty, or forty leagues, which they perform in thirty or thirty-five days.

The price paid for depasturing the lands, where they winter, is equally regulated by usage, and is very low; but it

is not in the power of the landed proprietors to make the smallest advance. The Mesta has its peculiar laws, which were originally made by the parties interested, the proprietors of flocks, and received the sanction of several sovereigns of Spain, among whom was Charles I., who approved and confirmed them in the year 1544. A particular tribunal also exists, under the title of "*honrado consejo de la Mesta*," or *the honourable council of the Mesta*. This court, in which one of the council at Castile presides, is composed of four judges, denominated "*Alcaldes mayores entregadores*," each having a fiscal or exchequer, and an escheator or *Alguazil mayor*. The cognizance of this court superintends the preservation of the privileges belonging to the Mesta. The judges levy upon the shepherds and their flocks pontage, parage, and other tolls; they settle the disputes and quarrels among the shepherds; direct the route the flocks ought to take in their journeys to and from the mountains; regulate what occurs on their passage; settle what respects their pasturage; in a word, they adjust every concern in which the Mesta can be supposed interested in the slightest degree. The proprietors of flocks, and even the shepherds, possess, to a certain extent, a power of *commitimus*, or commitment, which they very frequently abuse. They have the improper privilege of citing all kinds of persons, of whatever age or condition, before the Mesta, under a supposition, or pretence, that their altercations, or business, have some connection, however distant, with the jurisdiction of its court.

The public opinion throughout Spain is decidedly opposed to the Mesta, against the vexatious circumstances to which it continually gives rise, and the constant obstacles it throws in the way of agricultural improvements. In fact, the grievances arising from its effects are numerous and severe.

1. The number of persons it employs is very great, forty or fifty thousand; which are so many subjects lost to the state, as to the purposes of agriculture and population; and this takes place principally in those provinces where the strength requisite for the cultivation of the soil is most deficient.

2. An immense extent of highly valuable land is converted into pasturage; and produces comparatively nothing. The consequence is, that the inhabitants of such places find no employ, nor means of providing for their wants; they are refused the necessary articles for the support of life, because the lands on which they might be grown do not produce them.

3. The cultivated lands, which lie near the route the flocks take in their journeys to and from the mountains, are subject to continual trespass, which is committed with impunity; for in vain do the owners of those lands appeal against such abuses and solicit indemnity. The damages sustained on these occasions is so much greater, owing to the seasons of the year in which the journeyings of the flocks are made. The first is when the corn is generally far advanced in its growth; and the second when the vines are loaded with grapes.

4. The commonable pastures also, which are in the line of the route, are equally devastated; so that the flocks belonging to places in the vicinity can scarcely find a bare subsistence.

5. The flocks which compose the Mesta are unprofitable for agricultural purposes; for never being folded upon the arable lands, they consequently contribute nothing towards their fertilization.

6. The directors and shepherds are dreaded in every place through which they pass; for they exercise a most insufferable

able despotism, the consequence of the improper privilege they possess of bringing whomsoever they may chuse to insult before the tribunal of the Meffa; whose decisions are almost invariably in favour of its servants.

These grievances have for time immemorial excited the most forcible protestations against them; the general states of the realm have incessantly requested the suppression of the Meffa, and the complaints and addresses of the people have been repeatedly presented at the foot of the throne. For a long series of years all appeals upon the subject were in vain. They at length, however, became so loud and pressing, towards the middle of the eighteenth century, that the government found itself obliged to pay some attention to the subject. A committee was formed to make the requisite inquiry, whether it were more eligible for public utility to continue, or suppress the Meffa? and, provided the committee should determine on the former measure, what modifications might be proper to adopt for its better regulation. The persons interested were very powerful, and they made sure of evading this wise disposition for remedying the evils of the Meffa. The committee, though permanently established, have done nothing these thirty or forty years. Affairs remain in just the same state, and, as it too frequently happens, the interest of a few individuals still obtains the advantage over the public good. Laborde's View of Spain, vol. iv.

MESTERO, in *Geography*, a cape on the N. coast of Egypt; 10 miles N.E. of Rosetta. N. lat. 31° 25'. E. long. 30° 54'.

MESTI, a town of Austrian Poland, in Galicia; 6 miles E.S.E. of Belcz.

MESTRA, a town in the Trevisan; 8 miles N.W. of Venice.

MESTRE BAY, *Little*, a bay on the N.E. part of Newfoundland island, S. of St. Julian, and N. by W. of the islands Gros and Belle.

MESTREZ AT, JOHN, in *Biography*, a celebrated French Protestant minister, was born at Geneva in the year 1592. When he was yet very young he was sent to the academy at Saumur, where he afforded such evidence of his abilities and proficiency, that he was offered a professorship of philosophy when he was only eighteen years of age. He became an eloquent and highly distinguished preacher, and there are said to be no sermons that contain more sublime theology than those which he preached upon the epistle to the Hebrews. He conducted the controversy concerning the authority of the church with forcible reasoning, and completely refuted all the subtilties of father Regourd and cardinal Perron on this subject. He died in 1657, leaving behind him a number of theological works that do honour to his memory: of these the chief are, "A Treatise on the Holy Scriptures, in which is shewn the Certainty and Fulness of Faith, and its Independence on the Authority of the Church;" and "An Exposition on the Epistle to the Hebrews, in a Course of Sermons," making five volumes 8vo. Bayle.

MESTURA, in *Geography*, a town of Africa, in the kingdom of Tunis.

MESUA, in *Botany*, a Linnæan genus, in honour of *Mesue*, the father and son, two celebrated Arabian physicians and botanists, who resided at Damascus, and who flourished in the eighth and ninth centuries. The works of the younger *Mesue*, medical and botanical, were published in folio, with annotations, at Venice, in 1581.—Linn. Gen. 268. Schreb. 471. Willd. Sp. Pl. v. 3. 843. Mart. Mill. Dict. v. 3. Juss. Geol. 258. Lamarek Dict. v. 4. 416.—Class and order, *Menadelphina Polyandria*. Nat. Ord. *Guttifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of four, ovate, concave, obtuse, permanent leaves, the two outward, opposite ones smaller. *Cor.* Petals four, abrupt, undolated. *Stam.* Filaments numerous, capillary, the length of the corolla, united at the base into a sort of cup; anthers ovate. *Pysl.* Germen superior, roundish; style cylindrical; stigma thickish, concave. *Peric.* Nut roundish, pointed, marked with four, longitudinal, elevated furrows. *Sed.* solitary, roundish.

Ess. Ch. Calyx simple, of four leaves. Corolla of four petals. Nut slightly four-sided, single-seeded.

1. *M. ferrea*. Linn. Sp. Pl. 734. Fl. Zeylan. 91. (Naghas; Herm. Zeylin. 7. Nagassarium; Rumph. Amboin. v. 7. 3. t. 2. Bellutta Thiampakam, five Castanea rosea indica; Rheed. Malab. v. 3. 63. t. 53.)—A native of the East Indies, and much cultivated, according to Rheede, in Malabar, for the beauty of its flowers, which expand there in July and August. It bears fruit in six years from the nut, and continues to bear during three centuries. The same author subjoins a long account of its medical virtues, and Rumphius says, it is planted in Amboyna, about houses, for the shade it affords, and for the odour of its flowers, which also, when dry, are mixed with other aromatics, such as the white sandal-wood, and used for perfuming ointments.

This tree grows to a large size, having a variegated, thick, hard, smooth, much-branched trunk, like that of a lime-tree. *Bark* smooth, brown, aromatic, of a sharp and bitter taste. *Root* fibrous, red, covered with a smooth, yellow bark, bitter, but sweet-smelling. *Leaves* opposite, on short stalks, smooth, thickish; of a shining green on the upper side; glaucous-blue underneath, like the bloom of grapes. *Flowers* in size and shape like those of the Sweet-briar or Eglantine, but with only four white petals. Their smell partakes both of the rose and violet. *Fruit* smooth and greenish, but reddish and wrinkled when ripe, with a rind like that of the chestnut, and three or four kernels within, the shape, size, substance, and taste of chestnuts.—The specific name is taken from the close texture and hardness of the wood.

MESUA, in *Gardening*, comprises a plant of the exotic shrubby kind, for the hot-house of which the species cultivated is the ferreous Indian mesua (*M. ferrea*.)

Method of Culture.—This plant may be increased by seeds, layers, and cuttings. The seeds should be sown in the spring, in pots of light earth, plunging them in a bark hot-bed in the stove. When the plants have attained some growth, they should be planted in separate pots and be replunged in the bark-bed, where they must be kept.

The layers should be made from the young branches, and should be laid down in the autumn or early spring, being taken off when well rooted, and planted in separate pots, having the same management as the others.

The cuttings should be taken from the young branches, and be planted in the summer in pots of light mould, and plunged in the bark-bed. When they have stricken root, they should be removed into separate pots, and be managed as the others.

Plants of this kind afford variety among other stove plants.

MESUA, in *Geography*, a town of Arabia, in the province of Yemen; 40 miles N. of Chamir.

MESUE, in *Biography*, one of the early physicians among the Arabians, was born at Nisabour, in the province of Khorasan, and flourished in the ninth century. He is said to have died in 846, or, according to other accounts, in 865. His father was an apothecary at Nisabour. Mesue was educated in the profession of physic by Gabriel, the son

son of George Bactishua, and through his favour was appointed physician to the hospital of his native city. Although a Christian of the Nestorian sect, he was in great favour with several successive caliphs, being reputed the ablest scholar and physician of his age. When the caliph Haroun al Raschid appointed his son, Almammon, to the vicerealty of the province of Khorasan, Mesue was nominated his body physician, and was placed by him at the head of a college of learned men, which he instituted there. On his accession to the throne of the caliphs, in the year 813, Almammon brought Mesue to Bagdad, and made him a professor of medicine there, as well as superintendant of the great hospital, which situations he occupied a great number of years. He was also employed, under the auspices of the same caliph, in transferring the science of the Greeks to his own country, by translating their works. Freund is of opinion that Mesue wrote in the Syriac tongue, which prevailed in his native province, long before and after his time; for not only he, but the Bactishuas, are reckoned Syrians by Abulpharagius and Abi Osbaia, though born at Nisabour. He was the author of some works, which are cited by Rhazes and other writers, which appear to have perished: for the works, which are now extant in his name, do not correspond with these citations, nor with the character of them given by Haly Abbas; not to mention, that in these works the writings of Rhazes are quoted, who lived long after his time. Abi Osbaia enumerates thirty-seven books written by Mesue, among which is one upon purging, and another respecting decoctions. Freund's Hist. of Physic, vol. ii.

MESUE, *the Younger*. A writer of this name, or *Mesuech*, who was later than Rhazes, and a Christian of the sect of Jacobites, is mentioned by Leo Africanus. He studied medicine and philosophy at Bagdad, and practised at Cairo, where he died in the year 1015, at the age of 90. He wrote some treatises on potable liquors, and on the composition of medicines: and perhaps to him may be attributed the work entitled, "Joannis Mesue Damasceni de Re Medica, lib. iii." edited by Jac. Sylvius, Paris, 1549, folio, and often reprinted. Eloy Dict. Hist. de la Med. Gen. Biog.

MESURACA, in *Geography*, a town of Naples, in Calabria Citra; 8 miles S.W. of St. Severina.

MESURADA, a sea-port town of Africa, in the country of Tripoli, and residence of a governor: a considerable commerce is carried on at this place by means of the caravans that pass into the interior parts of Africa. This is the chief place of a district anciently called "Cyrenaica" and "Pentapolis," from its five cities; 100 miles E.S.E. of Tripoli. N. lat. 32° 10'. E. long. 15° 10'.

MESURADO, a river of Africa, which runs from the mountains that separate Negroland from Guinea, into the Atlantic, N. lat. 6° 25'. W. long. 10° 35'.

MESURE, Fr.; *Misura*, Ital.; measure, in *Music*. In poetry measure is expressed by *metre*; in music, by *time*. See MEASURE, METRE, and TIME.

MESVRES, in *Geography*, a town of France, in the department of the Sône and Loire, and chief place of a canton, in the district of Autun; 5 miles S. of Autun. The place contains 608, and the canton 6277 inhabitants, on a territory of 302½ kilometres, in 12 communes.

MESYMNIMUM, a name which the ancients gave to a part of their tragedy, or to certain verses in their tragedies.

The mesymnium was a kind of burden, as *Io Pean*; *O Dithyrambe*; *Hymen*, *O Hymenac*; or the like; which, when placed at the end of a strophe, was called *epymnium*; and

when inserted in the middle of a strophe, *mesymnium*. See STROPHE, and CHORUS.

MET, in *Rural Economy*, a term applied to a measure which contains a strike, or four pecks.

META, in *Geography*, a river of South America, which, after receiving several tributary streams, runs into the Orinoko; 30 leagues below the cataracts of Aturas, and 125 leagues from St. Thomas of Guiana. This river, says Depons, seems destined by nature to form vast commercial relations between the whole eastern part of the kingdom of Santa Fé and Spanish Guiana.

METAC, a town of Upper Siam; 130 miles N.W. of Porfelow.

METACAL, an Egyptian weight, used in the weighing of pearls, and consisting either of a carat and a half, or of two carats. Sixteen of these carats make a drachm, each of the carats weighing four grains, and twelve drachms an ounce.

METACARPIUS, in *Anatomy*, the name given by Winslow to the adductor ossis metacarpi digiti minimi; which see.

METACARPUS, one of the divisions of the bones of the hand, placed between the wrist and the fingers. See EXTREMITIES.

METACARPUS, *Fracture of*, in *Surgery*. See FRACTURE.

METACHORESIS, a word used by Galen, to express a recess of a morbid humour from one part of the body to another, a thing very common in many distempers.

METACHRONISM, formed of *μετα* and *χρονος*, *time*, in *Chronology*, an error in computation of time, either on the side of defect or excess.

METACINEMA, from *μετα*, and *κινω*, *to remove*, in *Surgery*, a removal of the pupil of the eye from its natural situation.

METACISM, METACISMUS, in *Grammar*, a defect in the pronunciation of the letter M.

Idore represents the metacism as a final *m*, followed by a vowel, as *bonum aurum*, *Bethlebens erat*, &c.

METACOE, in *Botany*, a name given by the people of Guinea to a plant, of which they are very fond, because of its virtues as a balsamic and vulnerary. Its leaves, being bruised and applied to a fresh wound, cure it. They have also another use for it, twisting the dried leaves into a sort of match for their muskets. Phil. Trans. N° 232.

METACONDYLI is used by some authors for the outermost bones, or joints of the fingers, next the nails.

METADELO, plur. *Metadeli*, in *Commerce*, a corn and liquid measure at Florence. For corn, the moggio contains 24 staja; and the staja 16 metadeli; and the moggio contains about 16 English bushels. Oil is sold by the barile of 32 boccali or metadeli, the whole weighing 88lbs. of Florence, or about 66lbs. avoirdupois.

METAGITNION, *μεταγειτωνων*, in *Chronology*, the second month of the Athenian year. It contained twenty-nine days, and answered to the latter part of our July and beginning of August. The Boeotians called it *Panemus*, and the people of Syracuse, *Carnius*.

It is so called from *Metagitnia*, one of Apollo's festivals kept in it.

METAGONITÆ, in *Ancient Geography*, a people of Africa, who inhabited the environs of the promontory of Metagonium, on the west of Mauritania Tingitana.

METAKOONA, in *Geography*, a town of Hindoostan, in the province of Cattack; 60 miles S. of Cattack.

METALS, in *Chemistry*, a class of simple bodies possessing peculiar properties. The ancients, who valued these bodies

METALS.

bodies most for their physical properties, did not bestow the exclusive name of metal on any body which was not malleable. Other bodies, which possessed similar characters, without being malleable, were called semi-metals. The peculiar brilliancy belonging to the metals is perhaps their most generally distinguishing character. The lustre exhibited by mica has some resemblance to the lustre of metals, but it is very inferior in degree, and is merely confined to the surface. The great specific gravity of most metals has been thought a sufficiently distinguishing character. This property, to a certain extent, was very striking. Till the late discoveries of Mr. (Sir H.) Davy, the lightest of the known metals was of greater specific gravity than the densest body which was not a metal. The bases of potash and soda, however, have all the characters of metals, with the exception of being defective in the property just alluded to, since potassium and sodium are of less specific gravity than water. From these facts, therefore, we are no longer allowed to say that all metals are of greater specific gravity than other bodies.

In the present state of our knowledge there appear to be two classes of elementary matter, namely, oxygen, which constitutes one class, and oxydable bodies, or such bodies as combine with oxygen. Of the latter class, out of 45 varieties, there appear to be only five which are not metallic. The metals, therefore, comprise by far the greatest part of the elementary bodies.

Dr. Thomson has divided the metals into four classes; 1. Malleable. 2. Brittle and easily fused. 3. Brittle, and difficultly fused. 4. Refractory.

I. Malleable.

- | | |
|---------------|-------------|
| 1. Gold. | 8. Mercury. |
| 2. Platinum. | 9. Copper. |
| 3. Silver. | 10. Iron. |
| 4. Palladium. | 11. Lead. |
| 5. Rhodium. | 12. Tin. |
| 6. Iridium. | 13. Nickel. |
| 7. Osmium. | 14. Zinc. |

II. Brittle, and easily fusible.

- | | |
|--------------|---------------|
| 1. Bismuth. | 3. Tellurium. |
| 2. Antimony. | 4. Arsenic. |

III. Brittle, and difficultly fusible.

- | | |
|---------------|----------------|
| 1. Cobalt. | 4. Molybdenum. |
| 2. Manganese. | 5. Uranium. |
| 3. Chromium. | 6. Tungsten. |

IV. Refractory.

- | | |
|---------------|------------|
| 1. Titanium. | 3. Cerium. |
| 2. Columbium. | |

Besides the metals arranged in this table, there are a number of others lately discovered by Mr. Davy, which are the bases of some of the earths, and the two fixed alkalies. If the whole of the earths, as well as the two fixed alkalies, have metallic bases, the number of metals to be added to the above will be 13. Those from potash, soda, barytes, strontian, zinc, and magnesia, have already been obtained, and have been named by Mr. Davy, potassium, sodium, barium, strontium, calcium, and magnesium. The four first of these appear to be malleable metals; the others are not sufficiently known.

Those metals which are not liable to be oxydated by exposure to the air, such as gold, platina, silver, &c. have

been called noble; while those which become tarnished and corroded, were termed base metals. These distinctions have now become obsolete.

The metals have always, and must continue to be of the utmost importance in chemistry, in the arts and manufactures, and in domestic economy. Their malleability and hardness render them highly fitted for making various vessels and utensils, and their lustre and colour are agreeable to the eye. The properties of hardness and tenacity united, such as belong to iron and steel, are of great utility in various kinds of edge-tools, and the elasticity which is constituted by certain degrees of these two properties, could scarcely be furnished by any other substance than steel; hence its great usefulness for making springs.

The ductility of some metals is so great, as to admit of its being drawn into wires much finer than a hair. Gold, although the most laminable of all the metals, or which may be made into the thinnest leaves, does not admit of being drawn into the smallest wire, owing to its want of hardness. Iron, in consequence of possessing greater hardness, with a considerable portion of that property by which the particles of bodies attract each other in all situations equally, is capable of being drawn into finer wire than gold. Indeed pure gold is less ductile than when it contains a certain portion of copper. In treating of some of the physical properties of metals, such as malleability, ductility, hardness, and tenacity, much uncertainty has prevailed, from the want of some of these terms having definite meanings.

That property of a metallic bar or wire, by which it resists the action of a weight in the direction of its length, has been called tenacity, and this is always the measure of its strength. This power in metals, however, is evidently dependent upon two properties, one of which is its hardness, and the other a property for which philosophers have no precise word; perhaps the word flexibility may come the nearest. We mean, however, that property by which its particles can be changed into any situation, without separation. In the drawing of a piece of wire, some of those particles which constitute its thickness, before it passes through the hole of the wire-plate, are, by the process of drawing, brought into the direction of its length. This property in the greatest degree enables a piece of wire, or a thin slip of metal, to be bent backwards and forwards without breaking. A single experiment will satisfy any one of the propriety of these remarks. Take a piece of copper or iron wire, previously well annealed, and it will be found exceedingly flexible, and may be twisted or bent considerably, without breaking. If a weight be hung to it, with a view to break it, it will stretch considerably before it breaks. If a piece of the same wire be drawn through one or two holes, it will be found much stiffer and harder, and of course smaller: it will also be less capable of being bent or twisted without breaking. If, however, a trial be made of its strength, it will require a much greater weight to break it than in the annealed state; although its diameter is diminished. If the hardness be still increased by these means, a maximum of strength would be found under some joint proportion of the hardness, and the property of bending or twisting, which we may for the present call flexibility. It is on this latter property, with a certain degree of hardness, that the malleability and ductility of metals depend. It requires rather less hardness to make a metal to the best advantage into sheets, than to draw it into wire. This evil, however, of the wire breaking from being soft, may be remedied by making less difference in the size of the holes in the wire-plate. By this means the greatest ductility and malleability may exist under the same degrees of hardness and flexibility.

Metals, with regard to their hardness and flexibility, are very different under different circumstances. Some metals, however, are more susceptible of this change than others. Steel may be so soft and flexible as to bear much twisting, and be easily penetrable by the file, which happens when it is newly annealed; while, if it is heated red-hot, and cooled rapidly, it becomes extremely brittle, and is sufficiently hard to cut glass. Lead, on the contrary, under all circumstances, has the same degree of stiffness and hardness. The same is pretty nearly the case with tin.

Some hints were given under the article LIQUIDITY, which may throw some light on this mysterious property of metals. It is there conjectured, that the particles of bodies may be capable of assuming two states, one in which the particles attract each other equally in all directions. Hence whatever motion may take place among them, the same attraction still exists. It is in this state that bodies can be changed in their figure, without destroying their aggregation.

On the other hand, it is supposed that the particles of bodies, under certain circumstances, may possess polarity; and that the strongest attraction, and, consequently, their greatest hardness, may exist, when the particles are so arranged that opposite poles are presented to each other. Any thing, therefore, which facilitates this change to polarity, will increase the hardness of a body. The crystalline form, which is common to some metals, strongly favours this idea; since metals are always harder in this state, than when their *fibrous form*, as it is called, is brought about. Metals seem to acquire the greatest hardness by cooling rapidly, through a great range of temperature. It is in this change, therefore, that the particles acquire the greatest polarity, and by which the body becomes the most brittle and elastic. Indeed it is on the principle of polarity only, that we are enabled to explain the elasticity of bodies. Heat appears to be the most efficacious in destroying the polar property. The body would, however, regain it by rapid cooling; but by slow cooling, it is rendered soft to the greatest degree of which it is capable, and in the same proportion malleable and inelastic.

The hardness of metals, when they have been annealed, may be considerably increased by hammering, rolling, or wire-drawing. This change appears to be brought about merely by condensation. The small degree of polarity left in the particles will exhibit itself in the elasticity, when the particles are brought nearer together. It will be equally evident that the particles will be attracted with more force, and that the hardness will be increased. The hammering does not appear to increase the hardness of a body which has assumed the crystalline form, under which the greatest polar power is supposed to exist, but rather to diminish it. If a piece of steel plate, which has been hardened and tempered, be hammered carefully, the elasticity and hardness become less. Upon heating it, however, till it becomes blue, the elasticity returns. The hammering, in this instance, deranges the poles of the particles, which the slight heat restores to their proper positions.

From what has been observed it will be easy to infer, that no metal can be malleable under its crystalline or polar form. Several of the metals are scarcely susceptible of this form: among these we may enumerate gold, silver, and lead, and, in all probability, mercury. Others are deprived of it, and become malleable by hammering or rolling at a certain temperature. Of these are copper, brass, iron, steel, tin, and zinc. There are other metals, indeed the greatest part of them, which are not capable of any other than the crystalline form, and hence are not malleable. Of these we may mention antimony, bismuth, arsenic, cobalt, and manganese. What strengthens the idea that the crystalline form is the

cause of the want of softness and malleability, is the circumstance of copper and tin being separately very soft and malleable; though an alloy of these two metals is as hard as steel, and does not possess the least malleability. Cast steel and blistered steel are in the crystalline form, till they have been hammered at a certain temperature. In the first state they are hard and brittle; in the latter, they are flexible, and are increased in tenacity.

Brass wire appears to undergo some change in its arrangement, by hanging up in a damp room, or in situations where the fumes of acids prevail. It becomes so brittle as not to admit of bending to a right angle. This appears to arise from an increase in its polar form, for heating it red-hot partly restores its malleability.

The fusibility of metals is a very valuable property, since it not only admits of their being cast into almost any form, but the refuse can be made into its original form, which allows of great economy.

Some metals are better fitted for casting than others. It is observed, that all those metals of which we have spoken as being susceptible of the crystalline form, are the best calculated to take fine impressions. At that point in which the metal passes from the liquid to the solid form, a sudden expansion takes place, by which the volume is increased, and, in consequence, presses more strongly against the sides of the mould. This is particularly the case with brass, cast iron, and copper with tin. In forming alloys the most fitted for casting, a simple method offers itself. Let the specific gravity of the solid be as much as possible less than the liquid. In such bodies it will be found that the solid metals will float upon the liquid.

The property which metals possess of reflecting light, is highly important in the arts, sciences, and in common life. The surfaces of many of the metals, when they are smooth and polished, reflect almost all the light which falls upon them. White metals reflect more light than those which are coloured. The hardest metals are best fitted for reflectors, because they assume the finest polish. It has been thought that this property depended upon the density of these substances. This idea, however, seems incorrect, since sodium and potassium, which are less dense than water, appear to possess the power of reflecting light equal to many other metals. It is the great quantity of light which they reflect to which they owe their lustre. The great facility with which metallic bodies conduct heat is of incalculable utility in the arts, and in the economy of human life. The boiling of most fluids would be almost impracticable in any other vessels than those of metal.

This property has been applied to great advantage in the process of drying various articles. Large tubes of metal, being filled with steam, are kept constantly at nearly 212° . The goods to be dried are wrapped round the outside of the tube.

The metal gives up its heat with such facility, as to dry the substances upon it in a very little time.

Metals are the best conductors of electricity, and hence are highly useful in electrical science, as well as in preserving the lesser conducting substances from the effects of lightning.

The greater number of the metals are acted upon by the air, especially when aided by heat. Metals were thought by the ancients to be compounds of an earth combined with phlogiston. When these bodies were acted upon by the air, they supposed that the phlogiston was separated, leaving behind a calx, or earth. The ancients did not weigh their products, or else they would have found, that although this imaginary substance phlogiston had escaped, yet the residuum was heavier than the original metal. By the greater accuracy

racy of modern experimenters, it has been found that the metal is the simple body, and that, by combining with the oxygen of the atmosphere, the metal is converted into a substance of an earthy appearance, which, in modern chemistry, is called an oxyd of the metal.

The bodies formed by the combination of metals with oxygen, exhibit, as well as the metal, an ample field of utility to man. These bodies, in various forms, are valuable auxiliaries in the healing art. Some of them constitute rich pigments of the utmost importance to the arts. Others are not less valuable to the dyer and the bleacher. Several metallic oxyds are used to great advantage for polishing marble, glass, and metals.

METALS for Specula. See SPECULUM.

METALS, Colours from. As metals have a strong texture in their metalline form, so they preserve their natural colours durable, unless corroded or dissolved by particular menstrua, after which their solutions strike particular durable colours, or afford the strongest stains.

Iron dissolved in stale small beer gives the beautiful yellow and different shades of buff colour, used in printing linens and cottons, &c. When sublimed with sal ammoniac it also affords a yellow; and the common iron-moulds made by ink are owing to the iron dissolved in the copperas of which ink is made.

Copper melted with zinc appears of a gold colour; dissolved in aquafortis, it affords a beautiful green; and in any alkali a beautiful blue. And these solutions may be reduced to dry colours by crystallization or evaporation; and the same metal, precipitated out of aquafortis with common salts, gives the turquoise colour to white glass. Tin, a white or colourless metal, affords a light blue colour, when fluxed with antimony and nitre. The same metal is necessary in striking the scarlet dye with aquafortis and cochineal; and its calx, by strong infusion, turns to a glass of an opal colour.

Lead, corroded by the fumes of vinegar, gives the fine white cerufs; burnt in a strong naked fire, it becomes the strong red-lead, or minium; and melted into a glass with sand, is of the hyacinth colour. Shaw's Lectures, p. 171.

Silver being dissolved in aquafortis, if chalk be put to the solution, turns of a beautiful purple or amethyst colour; and its own solution, though pale as water, durably stains the nails, skin, or hair, brown or black.

Quicksilver, mixed with brimstone, makes a black mass, and this, by sublimation, affords the beautiful red pigment called cinnabar, or vermilion; and the solution of quicksilver being precipitated with common salt, yields a snow-white powder, which also turns black by being mixed with sulphur.

Gold, dissolved in aqua regia, affords a fine yellow liquor, which stains animal substances beautifully purple; and if the solution be sufficiently weakened with water, and mixed with a solution of tin, a fine red or purple powder may be procured, very useful for staining of glass and pastes to a beautiful red.

It appears, from the experiments of sir Isaac Newton, relating to the changes of colour that take place in pellucid colourless substances, that the less refrangible colours are exhibited by the greater thickness of air, water, and glass; and that as the thickness of those substances is diminished, they reflect the more refrangible colours. Hence he infers, that nothing more is requisite for producing all the colours of natural bodies, than the several sizes and densities of their particles. Accordingly he attributes the colours of permanently coloured bodies to the same cause by which they were produced in colourless substances, viz. to the

various thicknesses of their component particles. But no experiments were made on permanently coloured bodies, in order to establish the truth of sir Isaac Newton's opinion, till the ingenious Mr. Delaval directed his attention to this subject. From observing the circumstances above recited, and more largely illustrated under the article COLOURS, it appeared to him, that, if permanently coloured bodies are subject to the same laws as transparent colourless substances are, all such permanently coloured bodies, whenever the size of their particles is diminished, should undergo a change of colour, by ascending from the less refrangible to the more refrangible colours; and that such bodies, when the size of their particles is augmented, should undergo a contrary change, their colour in this case descending from the more refrangible to the less refrangible colours. In order to confirm this conclusion, he made a great variety of experiments with vegetable, animal, and mineral subjects, whereby the size of their particles, upon which their colours depend, might be diminished or increased. The methods which he used, in order to diminish the size of the particles of those bodies which were the subject of inquiry, were by dissolving, attenuating, &c. by means of chemical solvents, heat, putrefaction, dilution, &c. The contrary effects were brought about by such means as are known to condense, incrassate, or unite the particles of bodies into larger masses, as by coagulation, precipitation, evaporation, by diminishing the force of the solvents, &c. The metals afforded him numerous instances in confirmation of the doctrine above explained; for almost every operation, to which they are subject, exhibits a change of colour corresponding to this doctrine. This is particularly the case with regard to the imperfect metals; for every change of their texture is accompanied by a correspondent change of colour. We can only enumerate some of the principal results which Mr. Delaval obtained from a great number of well-conducted experiments. Thus, the green vitriol of iron is changed, in proportion as it is deprived of its solvent part, by exposing it to a strong heat, &c. to yellow, orange, red, and purple; and by a contrary process, viz. by a farther attenuation, by means of the phlogisticated lixivium, in the process of Prussian blue, &c. the colour of the iron ascends from green to blue; so that all the primary colours are produced from the same metal, in proportion as its particles are attenuated or incrassated. It appears, likewise, that when iron is divided into very small parts by means of a large quantity of glass, and by a violent heat, its colour is blue; but in proportion as it is less divided, by the mixture of a smaller quantity of glass, or the application of less heat, its colours are green, yellow, and red. From iron dissolved in its several menstrua, colours are produced in proportion as the solvent power of those menstrua is greater or less. Thus, iron dissolved in its strongest acid solvent, the vitriolic acid, gives green; in its weaker acid solvents, the marine and nitrous acids, yellow and orange; and in its weakest acid solvents, the vegetable acids, red. The colours of the calces of iron precipitated from its solution in the vitriolic and nitrous acid, descend from green to yellow, and from yellow to red; whereas the changes of colour arising from the solution of these calces, proceed in a contrary order, and ascend. Mineral substances are also frequently impregnated with iron, and their colours correspond with the state of the iron contained in them.

In the same manner the colours of the solution of mercury in the nitrous acid vary, in proportion as the solvent is extricated from it, from yellow to orange, and then to red. Thus also, those substances which have the greatest affinity with the acid of the corrosive sublimate produced

by the solution of mercury in the marine acid, disengage from its solution a red precipitate; and those, whose affinity with it is less, produce a yellow one. But these colours are liable to some variation, according to the greater or less quantity of acid in the solution. Mercury dissolved in the vitriolic and in the vegetable acids, exhibits, in proportion as its solvent is taken from it, the same colours which, under similar circumstances, are afforded by that metal dissolved in the other acids. All these mercurial preparations become red, when they are deprived of the principal part of their menstruum; and mercury calcined by heat, without the addition of any acid, acquires the same colour. Its colour, however, is subject to variation, from the action of its solvents; and thus the phosphoric acid changes the red to yellow and white. The same law obtains in the changes of colour to which the mineral manganese is subject; for Mr. Delaval found, that by means of the different degrees of power in the several solvents, these colours were produced in their regular prismatic order, *viz.* yellow, green, blue, purple, and red. The various phenomena of the sympathetic ink of M. Hellot conform to the same law, and are urged by Mr. Delaval as arguments to establish it. Heat and cold, he observes, are not necessary agents in the production or suppression of the colour. But it appears, that the alterations are effected by the moisture of the air, attracted by the saline matter when cold, and expelled from it when heated. When this ink is exposed to a moderate heat, in a white China cup, and when the greater part of the water is evaporated, the saline matter becomes green. This colour arises from a superfluous quantity of the marine acid, which soon flies off, and leaves the remaining part blue, slightly inclining to green. It also forms a hard dry mass, which, in a few minutes after its removal from the fire, grows moist, and assumes a light red colour. These alterations may be often renewed, by alternately heating and cooling the coloured matter; which does not again become green, after the superfluous marine acid is once evaporated. But a drop of spirit of salt, added to the red or blue mass, immediately renders it green. When preparations of cobalt are acted upon merely by heat, the order of the changes of colour effected in them, is such as, in other instances, constantly arises from that means of attenuation. Thus, when the yellow solution of this mineral, in the marine acid, is heated, it assumes a green colour, passing from a less to a more refrangible colour. When this solution is cooled, the yellow is restored.

Mr. Delaval observes, that as the inflammable matter, in the entire metals, acts strongly on the rays of light, it is necessary to calcine or to divide them into extremely minute particles, in order to examine separately the action of the calx, or fixed matter, on the rays of light. In order, therefore, to examine all the metals in the like circumstances, by reducing them into the smallest particles, and depriving them of their phlogiston as much as possible, he exposed each of them, united with a proper quantity of the purest glass, without any additional ingredient, to the greatest degree of fire which they are capable of bearing, without having all colour whatever destroyed. In this state it appears, from a variety of experiments and facts, that they actually do, without any exception, exhibit colour in the order of their densities as follow: gold, red; lead, orange; silver, yellow; copper, green; and iron, blue. He has also shewn that the other preparations of the metals, *viz.* their solutions, precipitates, crystals, &c. do for the most part exhibit the same colour, in the order of their densities, though not so invariably as their glasses; some small variation of colour happening in the more imperfect metals, pro-

bably from a change of density in their different preparations. Thus, gold acquires a red colour, by a minute division of its particles, without any addition. In the process of calcining lead in the furnace, the first of the primary colours which it acquires is yellow; the calx passing from that colour through orange into red. This variety of colours proceeds from the imperfection of the metal; which, probably, during its calcination (as our author supposed), receives a small portion of phlogiston, as well as air; for the effect of such an union must probably be a change of colour from orange to red: as Sir Isaac Newton has shewn, that bodies reflect more strongly in proportion as they possess more phlogiston; and that the less refrangible colours require a greater power to reflect them. The preparations of silver are yellow; the two most imperfect metals, copper and iron, being very easily acted upon by almost all menstrua, the colours of their solutions, &c. *viz.* green and blue, are apt to change into each other's order; the copper in some solvents becoming blue, and the iron green, and in other solvents *vice versa*; which probably depends on the increase or diminution of their densities. The preparations, &c. of mercury have been already examined. The specific gravity of platina being nearly equal to that of gold, it is found, agreeably to the Newtonian doctrine, confirmed by Mr. Delaval, that the precipitates and crystals obtained from solutions of this metal are red; and that a solution of it in aqua regia to perfect saturation is of a dark red, though, when diluted, yellow. Delaval's Experimental Inquiry into the Cause of the Changes of Colours in opaque and coloured Bodies, &c. 1777, passim. Phil. Transf. vol. lv. art. 3, p. 10, &c.

METALS, *Fluxes of.* See FLUX.

METALS, *Granulation of.* See GRANULATION.

METALS in the *Materia Medica*, furnish medicines of considerable importance and utility. Although the operation of the pure metals on the animal system is merely mechanical, yet when they undergo oxydation, or are changed by acids into the state of salts, they acquire a high degree of activity, and become effectual remedies in many disorders, when they are judiciously administered. Mercury and tin have, indeed, been employed in their metallic state. For what purposes and with what effect they have been so used, we state under the articles MERCURY and TIN. But metals are more generally and with greater efficacy previously combined with oxygen, acids, sulphur, &c. This is the case with respect to antimony, arsenic, bismuth, copper, iron, lead, mercury, silver, and zinc. This combination, for medicinal purposes, is effected either by the action of atmospheric air, with an increased degree of temperature; or by desagrations with nitrate of potash; or by the action of water; or by solution in an acid, the acid being subsequently abstracted by an alkali, or by some substance for which it has a greater affinity than it has for the oxyd of the metal. When oxygen is united with a metallic base, or the combination denominated oxydation takes place, in whatever mode it is effected, and oxyds of metals are thus obtained, they are found to lose their lustre, tenacity, inflammability, and other metallic properties, and they are changed into earth-like substances, the weight of which is greater than that of the portion of metal that has been employed. The activity of the oxyds of metals on the animal system depends, with a few exceptions, on the quantity of oxygen with which they are combined. Metals, in consequence of oxydation, become capable of uniting with acids, and forming soluble salts. The "metallic salts," therefore, are oxyds combined with acids, whether the oxyd previously prepared, be dissolved in an acid, or the salt be the product of the direct solution of a metal in an acid. In the latter case, the metal

metal first gains oxygen, either from a part of the acid itself, or from the water, or the air, which it decomposes; and the oxyd, thus formed, is then dissolved by the remainder of the acid. "The properties of the metallic salts are much varied by the previous degree of oxydizement of the metals; and this is a point, the fixing of which in pharmaceutical operations is of the first practical importance; for if in all the indefinite degrees of oxydizement the metallic oxyds combine with acids; the resulting salts must vary in as many shades as exist between the maximum and minimum of oxydizement. In the preparation of the metallic salts, therefore, the same strict attention is requisite in following one established and approved process."—"Many of the metallic salts are altered by exposure to the atmosphere; some effloresce and attract oxygen; some are altered in their properties by moisture; and others are reduced by the action of light; hence, all of them ought to be kept in well-stopped glass bottles; and perhaps these always should be either made of green glass, or otherwise rendered opaque. In compositions which require these salts to be dissolved in water, *distilled or filtered rain-water* should always be employed; and much attention is requisite to avoid combining them with incompatible substances, which may either chemically decompose them, or alter their medicinal properties." (Todd's London Dispensatory, 8vo. 1811.) For the principal metallic preparations used in medicine, see the several metals, *viz.* ANTIMONY, ARSENIC, &c. and also the names of these preparations as they occur in the order of the alphabet. But for a fuller account of them, with the instructions for combining them given in the London, Edinburgh, and Dublin dispensaries, we refer to the comprehensive and useful publication already cited. Part iii.

METAL, *Prince's*. See COPPER, GOLD-coloured Metal, and TOBAC.

This metal derives its name from prince Rupert, whom some supposed to have been the inventor of it, in 1680. But the greatest perfection this metal was ever brought to, was by two Frenchmen, M. La Croix, and M. Le Blanc. Their methods of making the composition, though both beautiful, were very different. M. Le Blanc's was the brightest, and of the most elegant and lively colour; but M. La Croix's was greatly superior to that in ductility and softness, so that it was very easily malleable.

M. La Croix invented a sort of varnish or lacquer for his metal, which added a somewhat deeper tinge to it, as it was naturally rather too pale; and had this farther advantage, that while it remained on the metal, it preserved it from rust or decay. This is a very material point in regard to a metal of which copper is the basis, since that is, of all metals, most subject to be injured by the air, or by the contact of liquids of almost any kind. M. Le Blanc's metal is of a deeper, yet equally lively colour, and remarkably bright; and is of such a temper as to be admirably fitted for working. The whole history of these metals is, certainly, that they are composed of zinc and copper in different proportions the one to the other; but it is not easy, without the help of numerous experiments, to determine what is to be the true proportion for either.

The microscope, however, shews a manifest difference, which may lead somewhat towards it; for the metal of La Croix is seen to be composed merely of a number of irregular stræ, while the other is discovered to consist of always two regular beds of them, which meet in the centre of the piece; hence it is that this is always brittle, and will not well polish. The fabric of these metals was long kept a secret; but it was always to be discovered by melting it in

a crucible in a strong fire, when it always sent up plain flowers of zinc, and the remaining metal appeared no other than copper altered by calamine; that is, common brass. Mem. Acad. Par. 1732.

METAL, *Bell*, is a composition of copper and tin melted together. See COPPER.

METALS, *Bluing of*. See BLUING of Iron.

METALS, *Painting on*. See PAINTING.

METALS, *Rust of*. See RUST.

METALS, *Line of*. On Gunter's sector are sometimes two lines thus called, and noted with the characters of the seven metals, ☉, ♃, ♄, ♀, ♂, and ♆; their use is, to give the proportions between the several metals as to their magnitudes and weights. See SECTOR.

METALS, *Tincture of*. See TINCTURE.

METAL, *Over*, in Gunnery. When the mouth of a piece of ordnance, in disparting it, lies higher than the breech, it is then said to be "laid over metal."

METAL, *Under*, is when the mouth of a piece of ordnance lies lower than the breech.

METAL, *Right with*. When a piece of ordnance lies truly level, point-blank, or right with the breech, it is said to be "right with its metal."

METALS, *Superficies of*, denotes the surface or outside of a gun.

METAL, in Heraldry. There are two metals used in heraldry, by way of colours, *viz.* gold and silver; in blazon called *or* and *argent*. See COLOUR.

In the common painting of arms, these metals are represented by white and yellow, which are the natural colours of those metals.

In engraving, gold is expressed by dotting the coat, &c. all over; and silver by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour on colour; so that if the field be of one of the metals, the bearing must be of some colour, and *vice versa*; otherwise the arms are false: though this rule admits of some exceptions.

METALEPSIS, in Rhetoric, is a figure in which two or more tropes, and those of a different kind, are contained under one word; so that several gradations, or intervening senses, come between the word that is expressed, and the thing designed by it. Thus, when Sylla says of Julius Cæsar, *In one Cæsar there are many Mariuses*. Suet. in Vit. c. 1. This is a metalepsis. So when Virgil describing that part of the African coast, where Æneas arrived with his ships, says, *A dark wood hung over it*, Æn. lib. i. ver. 665; and in the words of Dido, Æn. lib. iv. ver. 664, the same figure is used. Thus, the Roman phrase of "Fuit," or "Vixit," expresses that a person was dead. "Fuit Ilium et ingens gloria Dardanidum" signifies, by metalepsis, that the glory of Troy is now no more.

METALLIC, or METALLINE, an adjective applied to any thing that bears a relation to metals.

METALLIC Germination, *Mines, Vegetation, and Vitriols*. See the respective substantives.

METALLIC Solutions, in Agriculture, such fluids as contain some sort of metal suspended in them in the state of solution or diffusion. These sorts of liquids were formerly supposed to have a highly noxious or poisonous effect when applied to plants as manures and taken up as food; but some late experiments made by Dr. George Pearson seem to lead to a different conclusion.

This is further confirmed by the remarks of professor Barton of America, who, in a letter to the doctor, states his having been several years engaged in an extensive series of experiments

riments relative to the effects of various stimulant substances, such as camphor, &c. upon vegetables, as well as on the absorption of certain powerful mineral substances into the organical system of vegetables. "In numerous instances, he has subjected the stems and leaves of plants, young and old, large and small, to the influence of the sulphates of iron and copper, and has found that both of these metallic salts are very greedily absorbed by vegetables, inasmuch that he has detected the presence of iron in the vessels of a branch of a mulberry, at the height of five or six feet above the place of immersion in a solution of the sulphate of this metal."

He intends to communicate a full account of his experiments to the public in two memoirs. But suggests, in the mean while, that the sulphate of iron applied to vegetables in the manner he has mentioned, "is only a poison like almost every thing else, from the over dose," as mentioned by the doctor. "In several of his experiments, the branches of vegetables that were placed in vessels containing solutions of the sulphate of iron and copper, lived longer and exhibited more signs of vigour than similar branches that were placed in equal quantities of simple water. It is true, that in many other experiments these metallic salts proved fatal to his plants, but this was when he employed too large a dose. In like manner he has found several years ago that camphor, by greatly stimulating, often kills vegetables; and yet when properly dosed this is a very wholesome stimulant to plants; he had also found that large doses of nitre (which is unquestionably a powerful stimulant both with respect to animals and vegetables) produce an appearance like genuine gangrene in the leaves of vegetables; and yet it is certain that nitre, when it is judiciously dosed, may be made to greatly assist the healthy vegetation of plants.

METALLOID, in *Chemistry*, a name given to those metals which have been obtained from the fixed alkalis, and some of the earths. These bodies are so completely metallic, that they may, with the utmost propriety, be classed with the other metals, and such a distinction will therefore be unnecessary.

The metalloid said to be obtained from ammonia appears to have been given up by chemists. It was said to be produced by applying a globule of mercury at the negative end of a Galvanic battery, in contact with an ammoniacal salt. The mercury became of four or five times its original volume, and in the form of a soft solid. When this substance is exposed to the air, or thrown into water, the mercury assumes its original volume, and ammonia and hydrogen are exhaled. These appearances led Mr. (sir H.) Davy to conceive that the ammonia, like the other alkalis, contained a metallic base; and that during the Galvanic energy, this metallic base had been separated, and had alloyed itself with the mercury. From the great increase of volume, without a perceptible increase of weight, the specific gravity of this supposed base was deemed inconceivably small. Mr. Davy was more warranted in drawing this conclusion from some experiments, in which it appeared that ammonia contained oxygen. This fact, however, has been disproved by the experiments of Dr. Henry, and by those of Berthollet, jun. namely, that ammonia contains oxygen. The light amalgam produced in electrifying an ammoniacal salt with mercury, has been examined by Gay Lussac and Thenard, in their work entitled "*Recherches Physico-Chimiques*," tom. i. p. 52. The chemists consider the amalgam merely a compound of mercury, with hydrogen and ammonia. The phenomena which attend this process are in favour of such an opinion. Oxygen is given out in abundance at the positive wire, while a very little gas is observed at the negative wire, except when the mer-

cury is removed. The writer of this article, seven years ago, discovered that when a wire coated with mercury is on the negative side in pure water, a much less quantity of hydrogen is evolved than what might be expected from the quantity of oxygen at the other wire; and if the battery be not of tolerable strength, no hydrogen at all appears.

In the decomposition of the amalgam, they found that the ammonia was to the hydrogen as 28 to 23.

On the ground that mercury has the property of combining with hydrogen, and from the great levity of the bases of potash and soda, Mr. Murray is of opinion that these substances are compounds of hydrogen with some metallic base, with which we are not as yet acquainted. In addition to this, he observes, that in the decomposition of potash and soda, no hydrogen is given out at the negative wire, although water is present; he therefore concludes that the hydrogen must combine with the metal. It must be remembered, however, that during the decomposition of any metallic oxyd by Galvanism, no hydrogen is given out, although water is present.

The metalloid obtained from barytes has not been noticed under that article, because these discoveries have all been made since that part of this work was published.

Soon after the discovery of potassium and sodium, Mr. Davy subjected barytes to the same decomposing power. He first exposed the moistened earth in contact with mercury to the Galvanic battery. He found that the mercury lost much of its fluidity by being alloyed with a metal. This amalgam, on being exposed to the air, became covered with a crust of barytes. When the same was thrown into water, hydrogen gas was evolved, and barytes formed. This proved the presence of a metallic substance, capable of decomposing water, which was the base of barytes. Mr. Davy next mixed the moistened earth with one-third its weight of red oxyd of mercury, and placed them upon a plate of platina in a small cavity, where was lodged a globule of mercury. These materials being covered with a thin film of naphtha, the plate was connected with the positive side of the battery, the mercury with the negative, the two metals being separated by the earth and the red oxyd of mercury. By the influence of a powerful battery an amalgam was soon formed. This amalgam was then introduced into a bent glass tube, and the mercury distilled off. Although the heat was raised to redness, it was still rather uncertain whether the base was perfectly pure.

Mr. Davy has given the name of barium to this metallic substance. It is a white metal of the colour of silver, different from potassium. It is solid at the common temperature, but becomes liquid at a heat a little short of redness. It is not volatile at a red heat. When exposed to the air it soon absorbs oxygen, becomes tarnished, and ultimately falls down in the state of white powder, having returned to its original state by the absorption of oxygen. When this metal is thrown into water, the latter is decomposed with great rapidity, hydrogen is evolved, and barytes formed. The specific gravity of this metal is greater than that of potassium or sodium, since it sinks in water, and even in sulphuric acid.

Mr. Davy thinks its specific gravity four or five times that of water. Barium appears to be a malleable metal, since it is capable of being flattened at the common temperature.

The proportion of oxygen with which it combines has not been ascertained. If barytes be the first oxyd of barium, and the weight of atom of barytes be 68, the proportion

will be $\frac{68}{7} = \frac{100}{10.3}$, or 10 per cent. of oxygen, nearly.

For

For the rest of the metalloids, see the respective earths and alkalis.

METALLORUM *Crocus, Mater, and Sulphur.* See the respective articles.

METALLURGY, in a general sense, signifies the art of working metals under all circumstances. In its more limited meaning, it is confined to the art of separating metals from their ores. Since, however, these processes are given at full length under the heads of the metals respectively, it will be unnecessary to say more under this article. See **ASSAYING** and **SMEETING**.

METAMORPHISTS, in *Ecclesiastical History*, a sect of heretics in the sixteenth century, whose distinguishing tenet was, that the body of Jesus Christ was, upon his ascension to heaven, changed and metamorphosed into God.

METAMORPHOSIS, *Μεταμορφωσις*, formed of *μετα*, *change*, or removal from one place or state to another, and *μορφη*, *form*, or *figure*, *transformation*, the change of a person or thing into another form.

The ancients held two kinds of metamorphoses; the one real, the other apparent. The metamorphosis of Jupiter into a bull, and of Minerva into an old woman, were only apparent. That of Lycaon into a wolf, and of Arachne into a spider, and the like, they say, were of the real kind.

Most of the ancient metamorphoses include some allegorical meaning, relating either to physics or morality. Ovid's *Metamorphoses* is a collection of histories of such transformations, poetically related. Some authors are of opinion that a great part of the ancient philosophy is couched under them; and Dr. Hooke has made an attempt to unriddle and lay open the hidden meanings of several of them.

METAPARA, in *Geography*, a town of the island of Borneo; 70 miles S.E. of Nagara.

METAPEDIUM, in *Natural History*, a name given by some authors to a kind of stone, called by others *metatarsum*, and supposed to imitate a human foot. It is only a lusus nature in the formation of a common pebble.

METAPHOR, **METAPHORA**, *μεταφορα*, *translation*, or *displacing*, of *μετα*, *trans*, and *φορα*, *I bear*, or *carry*, in *Rhetoric*, a figure of speech, or a species of trope, whereby a word is transferred from its proper signification to another, different from it, by reason of some similitude between them; or whereby the proper denomination of one thing is applied to another: which other thing is more elegantly explained by this tralitious or foreign name, than by that which naturally belongs to it. As, when we say, the light of the understanding; to burn with zeal; to float between hope and despair, &c.

The metaphor is the most common of all the figures of speech; and is that usually meant, when we say a thing is spoken figuratively.

The metaphor is a short simile; or, as Cicero calls it, a similitude reduced to a single word; an image being thereby called from its proper subject to give the resemblance of another. An allegory is no more than a continued metaphor.

Quintilian says, that a metaphor is a short similitude, and differs from it only in this, that the former is compared to the thing we design to express, and the latter is put for it. It is a similitude, when I say of a man, he has acted like a lion; and a metaphor, when I say, he is a lion. But though metaphors are usually taken from a similitude between two things; yet sometimes they are founded in the similitude which two things bear to each other, in some particular respect, by means of which what properly belongs to one of them is transferred to the other: the former of which are

called *simple metaphors*, and the latter *analogous*. Hence the rudder of a ship may be called its reins; for what the reins are to a horse, that the rudder is to a ship, in guiding and directing it. Again, some metaphors are reciprocal in which the similitude holds either way. Thus to steer and govern are used reciprocally, both of a ship and a state; the proper expressions being to steer a ship, and govern a state, and the contrary metaphorical. From this account, therefore, of the nature of a metaphor, it may be defined, the application of a word, by way of similitude, to some other thing than what it properly signifies.

Quintilian distinguishes metaphors into four kinds: the first, when a word is transferred from one animal to another; as when Livy says, that Cato used to *bark* at Scipio; or when our Saviour calls Herod *fox*. To this class belong those forms of expression that occur in the sacred writings, by which the properties and affections of men are ascribed to the deity; as when God is said to hear, see, be angry, and repent, &c. The second, when the word is transferred from one inanimate to another; as *bridle* for *laws*; *floods* of fire, and *clouds* of smoke, denoting large quantities. The third, when inanimates are applied to animates; as the *flower* of youth. Thus, also, Homer calls Ajax the *bulwark* of the Greeks, and Cicero brands ill men with the character of being the *pest* of the state. And the last, when animates are applied to inanimates; as the river *disdain* its bounds. Thus Cicero speaking of Clodius says, the very altars, when they *saw* that monster fall, seemed to *move* themselves, and *assert* their right against him. Virgil, speaking of the impetuous force and rapidity of the river Araxes, says, it *disdain* a bridge. And it is a very usual epithet, which Homer gives to words, to call them *πτερωτα*, or *winged*, to intimate the swiftness of speech. And metaphors of this kind, which give life and action to inanimate things, are esteemed the finest and strongest.

As the metaphor is intended to set things before the eyes, it becomes so much the more perfect, as it shews them the more vividly, by representing them in motion and action. Cicero, speaking of a metaphor, calls it the most florid manner of expression, and brightest ornament of language, that consists in single words. A metaphor should have nothing in it either coarse or shocking, or that may raise it above the simplicity of nature, so as to be forced and harsh; nor should it appear a metaphor to any, but those who view it very closely. A metaphor should never be carried too far; for, in that case, it degenerates into puerility. Metaphors should always be followed in the same kind; they become unnatural, when different images are introduced. In all metaphorical dictions, there should be a kind of suitability to each other; different ideas are always absurd; as in this instance, the church was besieged with a deluge of troubles, where the two images, *siege* and *deluge*, have no relation.

The beauty of a metaphor is very strikingly exhibited in the following passages, extracted from lord Bolingbroke's Remarks on the History of England. Speaking of the behaviour of Charles I. to his last parliament, he says, "About a month after their meeting, he dissolved them; and as soon as he had dissolved them, he repented; but he repented too late of his rashness. Well might he repent; for the vessel was now full, and this last drop made the waters of bitterness flow."—"Here," he adds, "we draw the curtain, and put an end to our remarks." Nothing, as Dr. Blair observes, could be more happily thrown off. The metaphor, we see, is continued through several expressions. The *vessel* is put for the state or temper of the nation, already *full*, that is, provoked to the highest by former oppressions and wrongs;

this

this *last drop* stands for the provocation recently received by the abrupt dissolution of the parliament; and the *overflowing of the waters of bitterness*, beautifully expresses all the effects of resentment let loose by an exasperated people.

There is nothing young writers are more faulty in, than the indiscreet use of metaphors: those who affect the marvellous, are eternally on the metaphorical strain; nor know any bounds or restraint. They, who understand them best, use them with the greatest reserve. Mr. Addison proposes it as a rule for writers, to imagine their metaphors actually painted before them, and to view and examine the justness of their application and assemblage under those circumstances; throwing every thing out of the writing, but what might be retained in the picture. Card. Perron prescribes this general rule for metaphors, that they must always descend from the genus to the species; and never go backwards from the species to the genus: thus, we say figuratively, the *bonds of society*, and not the *human cords*, which tie us together; *bond* being a genus, and *cord* a species.

We shall close this article with a brief recital of the rules laid down by Dr. Blair as proper to be observed in the conduct of metaphors, which will also apply to tropes of every kind. Metaphors should be suited to the nature of the subject of which we treat. They should be neither too many, nor too gay, nor too elevated for it. The excessive or unseasonable employment of metaphors is mere soppery in writing; it gives a boyish air to composition, and, instead of raising a subject, in fact, diminishes its dignity, which should arise from sentiment and thought, not from ornament. This observation, as we have already suggested, demands the particular notice of young writers. A second rule respects the choice of objects, from which metaphors, and also other figures, are to be drawn. Accordingly, we should studiously beware of even using such allusions as raise in the mind disagreeable, mean, vulgar, or dirty ideas. Some approved authors have been incautiously betrayed into this error. Again, care should be taken that the resemblance, which is the foundation of the metaphor, be clear and perspicuous, not far-fetched, nor difficult of discovery. The transgression of this rule produces harsh or forced metaphors, which are always displeasing, because they puzzle the reader, and, instead of illustrating the thought, render it perplexed and intricate. Cowley is often chargeable with this fault. Farther, it must be carefully attended to, in the conduct of metaphors, never to jumble metaphorical and plain language together; never to construct a period so that part of it must be understood metaphorically, part literally, which always produces a most disagreeable confusion. Moreover, two different metaphors should never be made to meet on one object. This is what is called mixed metaphor, and is one of the grossest abuses of this figure; such is Shakspeare's expression, "to take arms against a sea of troubles." This makes a most unnatural medley, and confounds the imagination entirely. If we have occasion to doubt whether metaphors be or be not of the mixed kind, we should try to form a picture upon them, and consider how the parts would agree, and what sort of figure the whole would present, when delineated with a pencil. As metaphors ought never to be mixed, we should also avoid crowding them together on the same object. Finally, metaphors should not be too far pursued. This is called straining a metaphor, and drawing it out into an allegory; by which we shall tire the reader, and render our own discourse obscure. Cowley, lord Shaftsbury, and Dr. Young, transgress in this way. Blair's Lectures, vol. i.

METAPHRAST, METAPHRASTES, a translator, or

person who renders an author in another form, or another language, word for word.

A metaphrase, *μεταφρασις*, usually signifies something more than either a paraphrase, or a translation: according to Baillet, a metaphrast implies a translator, glossator, and interpolator, all at once.

METAPHYSICS, *METAPHYSICA*, *Transnaturalis*, a branch of science, about the nature and idea of which there is some difference among authors.

The word is formed from the preposition *μετα*, *trans*, beyond or above; and *φυσικη*, *nature*, or *φυσικη*, *natural*.

Some define metaphysics, that part of science which considers spirits and immaterial beings; which others choose to distinguish by the name of *pneumatics*, or *pneumatology*.

Others, keeping close to the etymology of the word, explain metaphysics by *trans-natural*, or *preter-natural*, or even *post-natural philosophy*: because it is subsequent in contemplation to the physical, though prior to it in the real order of beings.

Others, with more propriety, conceive metaphysics to be what some others call *ontology*, or *ontology*, *i. e.* the doctrine *de ente*, or of being, *quatenus* being.

In the same view, some philosophers call this science by the name *philosophia*, or *scientia generalis*, as being the foundation, or, as it were, the stem or root from whence all the other parts of philosophy arise, and wherein they all meet; its object being *being* in the abstract, or general, not restrained to this or that species of beings; not to spirit any more than body; so that the doctrines of metaphysics are applicable to all beings whatever.

Philosophers, again, are divided as to the notion of a science *de ente* in general. Some hold it real, precise, and solid enough to be demonstrated; but others judge it too obscure, faint, and confused, to be admitted into philosophy.

Being, abstracted from every sort of species of being, is certainly a very vague term, and does not seem to give scope enough for a science: we do not see how it can affect the mind as an object. Add, that the common metaphysics cannot demonstrate any part of its subject, but assume the whole: there are no principles or axioms, whereon to demonstrate metaphysics which contain the principles of all other sciences.

The first who wrote professedly on the subject of metaphysics is Aristotle. Indeed, he is the first who uses the word: *Μεταφυσικα* is the title of one of his books; but this some of his commentators will have to signify no more than *after the book of physics*. M. du Hamel, taking the preposition *μετα* in the sense of *post*, is even of opinion, that the word was coined by Aristotle's followers: and that it was unknown to Aristotle himself.

Aristotle's metaphysics seem to have been intended for a kind of natural theology. The metaphysics of Aristotle have been lately illustrated by the ingenious Mr. Harris, in his treatise, intitled "Philosophical Arrangements," 8vo. 1775.

Metaphysics, says this ingenious author, are properly conversant about primary and internal causes; and the study of them is metaphysical, because, though prior in itself, it is subsequent in man's contemplation, whose road of science is naturally upward, that is, from effect to cause, from sensible to intelligible.

Accordingly metaphysics have been, not improperly, defined "the science of the principles and causes of all things existing." Aristotle calls this science "the first philosophy," as it is not only superior, but prior in the order of nature, to the whole circle of the other arts and sciences. What is first in nature, however, is not first to man. Nature begins with causes which produce effects; whereas man ascends from

effects to causes. Hence, as "Physica" was the name given by Aristotle to the philosophy of body, some of his interpreters called that of mind "Metaphysics," thus intimating not only that its subject is more sublime and difficult, but that the study of it would be more properly and successfully undertaken "after that of physics." The followers of Aristotle were led to adopt this appellation by their master himself, who to the books in which he pretends to elevate the mind above things corporeal to the contemplation of God and things spiritual, prefixed the Greek words *μετα τα φυσικα*. However significant the name, in reference to the subjects which this science recommends, it has, from misapplication and abuse, as well as from the decline and extinction of the Peripatetic philosophy, sunk into disrepute; and although Malebranche and Mr. Locke have written much more clearly and consistently of metaphysics than any of the ancients; yet more modern writers have comprehended these subjects, which were formerly referred to metaphysics, under the appellation of *Philosophy of the Human Mind*. Under this article we propose to give a general account of it, and to mention the particular subjects which it includes.

METAPHYSICAL, something belonging to metaphysics.

The word is also used to denote something subtle, abstract, and refined. In which sense we say, such a reasoning, such a proof is too metaphysical, &c.

A metaphysical case is an imaginary or chimerical case, which can scarcely ever happen, or not without much difficulty; and which ought not to be laid down as a rule for common occasions.

METAPHYSICAL Certitude, Distinction, Evidence, Form, Perfection, Universality. See the respective substantives.

METAPHYSICAL Sect, in the *History of Learning*, is one of the two great sects into which the philosophical world was divided about the beginning of the 17th century. This sect followed the system of Des Cartes, and considered truth as attainable by abstract reasoning; and from a small number of abstract truths, deduced a long series of propositions, in order to arrive at a precise and accurate knowledge of God and nature, of body and spirit. The metaphysical philosophers, supposing that many things are known by man with the utmost certainty, discovered an undue propensity to form their opinions and doctrines into a regular system. The other sect was the *Mathematical*. (See **CARTESIANS**.) A branch of the Eleatic sect was denominated *Metaphysical*, by way of contradistinction to the *Physical*. See **ELEATIC Sect**.

METAPLASM, **METAPLASMUS**, compounded of *μετα*, and *πλασσω*, *fungo*, in *Grammar*, a transmutation, or change, made in the word, by adding, retrenching, or altering a letter or syllable of it.

METAPLEXIS, in *Botany*, so called by Mr. R. Brown, from *μετα*, together, or between, and *πλεωω*, to plait, or connect, alluding to the alternation of small leaves with the membranous-tipped anthers, composing a sort of wreath in the centre of the flower. Brown in *Wern. Transf.* v. 1. 48—Class and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apo-cynæ*, Juss. *Asclepiadæ*, Brown.

Ess. Ch. Corolla somewhat wheel-shaped. Crown of the stamens of five dwarf-hooded leaves, alternate with the membranous-tipped anthers. Masses of pollen tumid, pendulous, attached laterally. Stigma with an elongated undivided beak. Follicles . . .

A twining smooth shrub, found by sir George Staunton, bart., in the province of Peckelej, in China. The leaves are heart-shaped. Clusters on stalks, inserted between the

footstalks. Lamb of the corolla bearded. No specific name is mentioned.

METAPPOISIS, a word used by many physical writers to express a change of one distemper into another, whether it be by *diadoche*, or *diadexis*, as it is called; when the change is for the better, and the morbid matter removes from a more noble to an ignoble part: or by *metastasis*, when the change is for the worse, and the morbid matter removes from an ignoble to a more noble part.

METASTASIO L'ABATE PIETRO, in *Biography*, the bell lyric poet and writer of operas, or dramas, for music in Italy, during the last century, or perhaps during any age, or in any country. This exquisite poet, second son of Felice Trapassi of Assisi, and Francesca Galassi of Bologna, was born at Rome, January 6th, 1698, in the parish of Santi Lorenzo and Damaso, where he was baptized the 19th of the same month, by cardinal Ottoboni. His father, though descended from a family in Assisi, which had long enjoyed the privileges of free citizens, but which by a gradual decline, was reduced to poverty, not being able to subsist in the place of his birth, hired for a soldier in the regiment of Corsi, and soon after married Francesca Galassi, by whom he had many children besides the poet.

While he was in garrison, to the small pay of a soldier he added something towards the maintenance of his family, by becoming an amanuensis. And at length, having served the usual time, and by extreme industry and economy saved a little money, he entered into partnership with a shop-keeper at Rome, for the sale of goods which belong to what the Romans call *Parte bianca*, consisting of oil, flour, pastry, and other culinary materials.

And having been somewhat prosperous in this kind of merchandize, he placed his two eldest sons, Leopoldo and Pietro, at a grammar-school. The latter discovered an extraordinary quickness and disposition for literature, and a violent passion for poetry, with a power of making verses, extempore, on any given subject, before he was ten years old.

This faculty he was habituated to exercise, after school hours, at his father's shop, where great crowds used to assemble in the street of an evening to hear the young Trapassi sing *all' improvvisa*; who, besides the harmony of his numbers, was gifted with the melody of a fine voice. During one of these tuneful sittings, the learned civilian Gravina, having accidentally passed that way, was struck with the sweetness of the child's voice, and still more with his verses, which he soon found were extempore, and either upon persons who stood near him, or on playful subjects of their suggesting.

Gravina was so astonished and pleased at the precocity of the little bard's talents, that he stopt to carefs and converse with him, offering him money for his performance, which, however, the child modestly declined to accept. This so much increased the civilian's admiration, that he instantly conceived a wish to adopt him, for the pleasure of cultivating a soil which nature had rendered so fertile. that even the spontaneous flowers and fruits it produced were of a superior kind. Without hesitation he therefore applied to his parents, soliciting them to transfer to him the care of their son's education, promising to become not only his preceptor, but father.

As the child was still to remain at Rome, and no cruel preliminary was mentioned, by which his natural parents were prohibited from seeing him, and cherishing reciprocal affection, Felix was too wise, and zealous for the welfare of his son, to refuse the proffered patronage; and the next morning, Pietro was conducted by his father and mother to

the house of Gravina, and wholly consigned to his care and protection.

Our young bard was now, from the legitimate child of a shop-keeper, become the adopted son of a man of letters. And as his learned patron was partial to Greek literature, and wished to implant in the mind of the young Roman a respect and reverence for ancient lore, he translated his name into Greek; calling him *Metastasio*, instead of *Trapassi*; as *Μεταστας*, *Mutatio*, seemed at once to express his former name of *Trapassi*, and his new situation as an adopted child.

And having changed his name, he undertook the more difficult task of changing, or at least enlarging, his mental faculties; and at the same time that he was studying the learned languages, and imbuing his mind with the sciences, he wished to make him an orator rather than a poet, and determined that he should study the law as a profession; that and divinity being the only two roads by which a man of learning could arrive at honours and dignity in Rome. Poets, indeed, were rewarded with barren praise and acclamation, but wealth and affluence were strangers to their doors.

Yet while he was obliged to read the dry books of the law, and was seemingly occupied by other studies, he found time, by stealth, to read the great models of the art of poetry, for which his instinctive passion increased from the difficulty of gratifying it. At the name of Homer and Ariosto, his favourite poets, he was unable to contain himself; and Gravina discovering, in spite of his pupil's determination to conform implicitly to his will, that this exclusive passion for poetry was insuperable, at length permitted him to read those poets which he himself thought not only the best, but the only models of perfection. At the age of fourteen, during the early period of this indulgence, *Metastasio* produced his tragedy of "*Giustino*," conformable to the rigour of all the rules of the ancient Greek dramatic writers, with which his learned preceptor had supplied him.

We have his own opinion of this production, in a letter written to signor Calabigi, in which he says: "I should have wished that none of my early productions, which favour too much of adolescence, might have appeared in the Paris edition, particularly the tragedy of *Giustino*, written at fourteen years of age: when the authority of my illustrious master did not suffer me to move a step from the most religious imitation of the Greeks; and when my inexperience and want of discernment were unable to distinguish gold from lead, even in those mines themselves, of which he then began to display to me the treasures."

After producing this tragedy on the favourite model of his patron and preceptor, the learned civilian seems not only to have tolerated, but encouraged his pupil's adoration of the muses; and at eighteen carried him to Naples, expressly to afford him an opportunity of singing extempore with the most celebrated improvisatori of Italy at that time. *Metastasio*, in a letter to *Algarotti*, written in 1757, gives the following account of this poetical contention: "It is your wish to have specimens of the verses which I made extempore, during my childhood; but how can I possibly gratify this wish? I do not deny but that a natural talent for harmony and the muses was discovered in me, that was thought somewhat uncommon, and more early than usual, that is, at ten or eleven years old; that this phenomenon so dazzled my great master Gravina, that he was partial to it, and cherished me as a soil worthy of his cultivation: and that, so late as the year 1716, he exhibited me to speak verses, God knows how, for the benefit of *Georgio Loren-*

tino, upon all kinds of subjects; at which time I had for competitors the illustrious *Rolli*, *Vagnini*, and the cavalier *Perfetti*, men who were then arrived at full maturity, and veterans in Pindaric battles."

At twenty years of age he had the misfortune to lose his learned preceptor and patron, Gravina, who died in 1718, aged fifty-four. It has been doubted whether this event, which his heart inclined him to regard as the greatest calamity, was not a fortunate circumstance for his fame. *Metastasio*, whose writings evince him to have been all tenderness, gratitude, and disinterested sensibility, bewailed this misfortune with the deepest affliction; and in the elegy, called "*La Strada della Gloria*," written on this occasion, and read at a full assembly of the members of the arcadian academy founded by Gravina, he gave a public testimony of his sorrow and gratitude, expressive of those noble sentiments, which he cherished and practised to the end of his life. Nor did the beneficent will of his master diminish his grief or dry his tears, though, when opened, it was found to have been made in 1717, and that he had appointed him his heir.

By this liberal act, he verified his promise to the parents of *Metastasio*, of treating him as his own child. The advantage to his talents and to the lovers of poetry, which is supposed to have been derived from this early loss of his learned tutor, was the opportunity it afforded his genius to free itself from the trammels of Grecian rules and servile imitation. But though in his dramas he has more pathos, poetry, nature, and facility, than we are now able to find in the ancient Greek tragedians, yet his early study of them certainly elevated his ideas and style, and taught him how to shun the vulgarity and absurdities with which the early popular dramatists of most countries abound. He may be said to write with classic elegance, though he had liberated himself from classic chains.

Gravina's bequest to *Metastasio* consisted of 15,000 Roman crowns, between 3 and 4000 pounds sterling in money, an excellent library, and a great quantity of rich furniture, with three small places of which he had put him in possession before his decease, and a little estate in the kingdom of Naples.

But our young poet, now become a free agent, and a despotic prince over no contemptible fortune, among all his acquirements had not the least idea of prudence and economy. His conversation and verses had too much excellence to want admirers; and his table was too well served to want guests. He now wholly quitted the dry study of the law, and entirely devoted himself and his fortune to the muses and his friends. There was no poetical assembly in which he did not read some new production: as our *Garrick*, in the early part of his life, was found wherever lovers of theatrical amusements were assembled. Stimulated by the applause which every piece universally received, *Metastasio* thought of nothing but how to have it renewed by another composition. The love of praise is an infirmity to which the best minds are perhaps the most subject. During this intoxication, not a thought seems to have been bestowed on his present finances or future fortune. If he reflected at all during these times of dissipation, it was on the number of his friends and admirers, and the certainty of patronage whenever he should want it. What his predecessor *Petrarca* has said of the temple of love, was still more applicable to that of fortune by *Metastasio*.

"Errori, sogni, ed immagini smorte
Eran d'intorno all' arco trionfale,

E false opinioni in fu le porte,
E lubrico sperar in per le scale."

"Errors and dreams and thoughts half form'd abound,
And crowd the baseless fabric all around;
While at the threshold false opinions stand,
And on the steps, vain hope, with magic wand."

His patron's legacy was soon dissipated, not in the support of vice, but munificence and good cheer; so that at the end of two years, finding himself wholly reduced to his two small Roman places, his Neapolitan possessions, and his library, he went to Naples with the firm resolution of seriously resuming the study of the law. Being arrived in that city, 1720, he placed himself under the guidance of an advocate of the name of Paglietti, earnestly entreating his assistance in the study of jurisprudence, and promising, on his own part, to second the instructions which he should receive with all possible diligence and docility. Paglietti was one of the most eminent lawyers, at that time, in the city of Naples; but so rigorous a disciplinarian, and so totally devoted to his profession, that he not only despised but absolutely hated every species of ornamental knowledge or literature. Poetry was therefore ranked by him among the most deadly sins of which an advocate could possibly be guilty.

It is natural, therefore, to suppose that Paglietti, devoid of all taste for the arts of elegance, which help to humanize and polish our savage nature, was rough, sour, and forbidding in his address and manners: he was all law, and of that severe and merciless sort, which knows not how to pardon the smallest imprudence or deviation from worldly wisdom.

Metastasio was not ignorant of his severity and invincible hatred for poetry; but instead of looking upon it as an evil, he was the more eager to place himself under his most rigid discipline, in order to prevent a relapse into poetry, which had hitherto been to him so unprofitable a study. The reception of Metastasio by this Lycurgus, and his first lecture, were perhaps rendered more austere and acrid by the fame of his poetical talents, with which not only Naples but all Italy was already filled; but Metastasio, hearing it with heroic patience, renewed his promise of unwearied application, and kept it so well during his first residence under the advocate's roof, that he began to entertain great hopes of his becoming an excellent lawyer, and treated him with as much sweetness as his bitter nature would allow. He knew that the studies of his young disciple were frequently impeded by the visits of persons of learning and distinction, to whom his poetical abilities were well known, and who remembered him when he was brought to Naples, as an *improvvisatore*, by Gravina. But now their expectations were transferred to his legal abilities, upon which, from his learning and application, they had formed the highest hopes. It is certain that Metastasio, at this time, exercising the greatest tyranny over his natural inclination, refrained entirely, not only from writing verses, but from speaking them extempore, in spite of all solicitation. The first breach of contract with the rugged advocate, and first seduction of the muse during his residence at Naples, was in the beginning of 1721, at the instigation of the countess of Althan, who prevailed on him to write an Epithalamium for the nuptials of her relation, the marquis Pignatelli, with a lady of the Pinelli family: it consists of near one hundred octave stanzas, is full of elegance, and in the highest class of poetry. The drama of "Endymion," the first that he produced expressly for music, is said to have been written on the same occasion.

Metastasio's next infringement of the laws laid down by the advocate Paglietti against the wicked practice of poetry,

was occasioned by an application from the viceroy of Naples himself, that he would write a drama for music, to be performed on the birth-day of the empress Elizabeth, consort of the emperor Charles VI., who was then in possession of that kingdom. It is said that he was with difficulty prevailed upon to enter on this task, and only complied upon a promise that it should be kept a profound secret. Our bard, in perpetual fear of the inexorable lawyer, was obliged to sacrifice his hours of sleep to this contraband commerce with the muses. The piece was entitled "The Gardens of the Hesperides," and is one of the most beautiful of his early productions.

The next drama that was written at the expence of his legal studies, or his moments of rest and recreation, was "Angelica." This was printed at Naples in 1722, and set to music by Porpora for the empress's birth-day. It has been said in some accounts of Metastasio's early productions, that Farinelli's first public performance was in this *serenata*.

The poems which he produced at Naples were the admiration of all persons possessed of a love and taste for poetry, particularly "The Gardens of the Hesperides;" but none felt its beauties so forcibly as the Bulgarella detta Romanina, the greatest female singer and actress of her time; who, having performed the part of Venus in that occasional drama, was so enchanted with the uncommon beauty of the poetry, that she could not rest till she had been introduced to the acquaintance of the author. Indeed, tradition says, that this drama had an effect upon the audience in general, which Naples had never before experienced. The recitative was hardly begun, when the spectators formed a more curious spectacle than the actors themselves: so great was the change in their behaviour and mode of listening that was instantly produced. Violent noise and unbridled clamour used to reign in every part of that theatre, and could never be subdued but with great difficulty, even when some capital singer had a favourite air to perform; and it was no sooner over than the din was renewed with such vehemence, that even the orchestra could not be heard. But now, every one delighted by the new and decorous arrangement of the scenes, original beauty and sweetness of the verse, the force of the sentiments, the texture of the parts, and all the wonders of Metastasio's dramatic poetry, was forced, almost insensibly, into profound silence and attention.

Universal curiosity was excited, and inquiries made, after the author, who, though a poet and fond of praise, is said to have wished to lie concealed. But the Bulgarini, who was not only pleased in common with the lovers of poetry, but impressed with the most lively gratitude to the author of the "Hesperides," for the flattering reception and unbounded applause which this piece had procured her, both as an actress and singer, was impatient to be personally acquainted with him. And having discovered that she knew one of his intimate friends, she prevailed upon him to try to bring the poet to her house. He at first resisted the solicitation; but at length, ceasing to be inexorable, he was induced to make her a visit. The Romanina (as she was generally called from being a native of that city) had no sooner seen him, than she felt an uncommon regard for him. His poetical abilities, elegance of manners, and fine countenance, together with the circumstance of his being her countryman, or rather townsman, all joined to increase her regard; while Metastasio on his part felt equally unable, with all the stoicism he could muster, to resist the desire of improving the acquaintance; and frequently returned to enjoy the pleasure of her conversation.

He had soon reason to believe, from the countenance and

behaviour of Paglietti, that neither his theatrical production, nor the new stage acquaintance which he had made, was unknown to him. The praises he received from the Romanina, and all those to whom the secret had been divulged, and their pressing instances that he would continue to write, awakened his passion for poetry, which he had flattered himself was wholly subdued. He now began to feel, that by the narrow and contracted study of the law, his genius could never expand in his own original ideas, but would be constantly tied down to those of others. His reflections upon the fordidness of sacrificing his whole life to a distasteful business, for the mere hope of acquiring wealth, (as he afterwards confessed to his confidential friends,) joined to the harsh treatment of the old advocate, which became more intolerable in proportion as the assiduity of Metastasio diminished, entirely determined him to quit both him and his profession.

His female friend perceived the conflict and internal war; and in order to stimulate his courage and resolution, she and her husband invited him in the most pressing manner to reside under the same roof, and assured him that they would contribute every thing in their power to render his life as easy and comfortable as possible. He remained several months in a state of uncertainty; but at length determined to accept their offer, to return to poetry, and to enjoy the pleasures of society in full liberty. Yet he did not seem insensible of the apparent indecorum and want of fortitude which he manifested in quitting, with such seeming levity, the pursuit of studies which had been recommended to him by his deceased patron. Nor was he quite at his ease on the side of delicacy, as to appearances; the obligations to the Bulgarini, under which he was loading himself, frequently oppressed his mind. And yet so limited is our power of penetrating into future events, that the measures which he now pursued, far from impeding either his fame or fortune, were the foundations of all his subsequent celebrity. An Italian poet has well described the shortness of mental vision.

“ Sebben sembra talor che torvo e iniquo
Il volto verso noi volga la forte;
Ella seguendo suo costume antico
A inaspettata gioja apre le porte:
E asconde spesso sotto calle obliqua
Della felicità le vie più corte:
Onde non sappia in mezzo ai torti, e ai guai
L'uom che temer, nè che sperar giammai.”

“ Blind to the future, while he sojourns here,
Man knows not what to hope or what to fear;
Amidst misfortune, sorrow, and dismay,
Fate oft, in frowns, points out the shortest way
To fortune, fame, and unexpected joy,
By means which prudence trembles to employ.”

The Bulgarini was engaged to sing in the theatre of Naples, during the carnival of 1724; and being very ambitious of appearing to as much advantage in the next opera as she had done in that for the birth-day of the empress, she pressed the poet to write a drama, in which, as first woman, such a character might fall to her share, as would give her an opportunity of displaying all her powers, both as an actress and singer. It is easy to imagine with what zeal the Abate went to work, in order to gratify her wish. After many heroines had passed in review, Dido was at length chosen, and the drama, entitled “*Didone Abbandonata*,” produced; in which he chose the period of the hero, Æneas, quitting the Carthaginian queen: as it furnished scenes of the greatest force and passion, as well as more expression for his pen, and

more abundant opportunities for the display of the Romanina's abilities, than any other. This was the first perfect musical drama, perhaps, that ever graced the Italian stage. The applause it obtained was equal to that of the “*Orti Esperidi*,” and though the story was so well known, that no effects could be produced by surprise, yet the pleasure of the audience was excessive. It was set by Sarro, and the part of Æneas was performed by Nicolini.

From the great and sudden celebrity of “*Didone*,” which, immediately after its first appearance at Naples, was set by the best composers of the time for the other principal theatres of Italy; the Venetian minister at Rome, where it had been performed to Sarro's music, was instigated to apply to Metastasio to write the opera of “*Siroe*,” which he sent to Venice, where it met with a success equal to that of Dido, to the great emolument of the author, who was magnificently rewarded for the superior excellence of his poetry. This drama was set by Vinci at Venice, and performed and printed in 1726.

It appears from the original *libretti*, or printed books of the words, that the Romanina not only performed the principal female part in Metastasio's four first dramas at Naples, but in “*Didone*” and “*Siroe*,” with Nicolini, at Venice, in which city they were first represented in 1725 and 1726; and, according to Quadrio, (*Storia d'ogni Poesia*,) Metastasio himself was at Venice during these performances. It was during this period that he altered the old opera of “*Siface*,” for the same performers, at the request of Porpora.

In the carnival of 1726, while the dramas of Metastasio received such unbounded applause at Venice, “*Didone*,” as set by Vinci, was received at Rome with acclamation. The famous ex-jesuit Cordara, who was there at that time, in his eulogy of Metastasio, recited at Alexandria in 1782, describes its reception in the following manner:

“ Every scene produced one continued applause. But who can describe the rapture of the pit, when the queen of Carthage, disdainfully rising from the throne, represses the insolent pretensions of the king of Mauritania, with the dignity of an independent princess, by the spirited air, “*Son Regina*,” &c. The noise seemed to shake the theatre to its foundation. I was not there myself, as my habit did not allow me to be present at such spectacles: but I almost heard the rumour in my cell, so full was all Rome with the fame of this production.”

In 1727, the Romanina having fulfilled all her theatrical engagements at Naples and elsewhere, prepared to return to Rome, yet declared at the same time, that she would never see her native city again, unless in the company of her dear friend. He remained for a while irresolute; but, at length, the warm affection he retained for the place of his nativity, in spite of the neglect and disappointment which had driven him thence, heightened perhaps by his regard for the Bulgarini, and fortified by the desire of seeing his father, and the rest of his family, determined him to quit Naples, in company with his benefactress; but not before he had obtained a promise from her, that, in return for the hospitality which he had received under her roof at Naples, she and her family should become his guests at Rome. To this proposition all parties having acceded, he wrote to his agents, to provide a house sufficient for the two families of Trapassi and Bulgarini. And from the time of his arrival in that city, till his departure for Germany, they all lived under the same roof, and constituted one family. The Romanina, as more rich and accustomed to the management of a family, was invested with the superintendance of all household concerns: the rest had nothing to do, but to attend their own pursuits; while

while Metastasio received visits, wrote verses, improved his circumstances, and increased his celebrity.

The first drama which he produced, expressly for Rome, was "Citone in Utica," which was set by Vinci, and performed in that city, 1728; and in 1729, at Venice, to the music of Leo. He chose the subject purposely to please the Romans, supposing that he should gain both applause and gratitude, by displaying the virtue of one of their own heroes. But as it seldom happens that a prophet or a poet (which in ancient times were united in the same person) receives due honour in his own country, particularly at Rome, which is proverbially called the residence of strangers; in spite of the excellence of this drama, which abounds with sublime, as well as tender sentiments and delineations, of the passions of glory, ambition, anger, and love; and in which the conduct was natural, and catastrophe historical; it was instantly attacked by the satirical genius of the Romans, and the performance suspended. The frivolous scenes, and feeble poetry to which they had been long accustomed, had corrupted the taste of the Roman public in general; and, except a few learned men, less invidious than the rest, who, if they knew of no modern Cato, had read, at least, something about the ancient, this piece was at first very coldly received; though afterwards, when their minds and tastes were enlightened and refined by other original and beautiful works of our author, this drama was treated with more justice.

The next opera which our author produced was "Ezio," set by Porpora, in 1728, and "Semiramide Riconosciuta," set by the same composer, 1729; but though both these dramas were received in the most favourable manner, and the praises bestowed upon the poet were unbounded, his fortune was not greatly improved by their success. Poetry has more frequently enriched the bookseller than the author, in every country; but at Rome, it is a drug of less value, even to the bookseller, than elsewhere; and Metastasio's muse, however chaste, was but little better treated for not being meretricious. If Metastasio had been a mere psalmodist, or hymnologist, his monkish rhymes might have obtained him some ecclesiastical preferment; but the poetry which he produced on pagan and secular subjects precluded him from every avenue to the church. He was, however, far from necessitous; and with the assistance of the Romanina, whose purse was always at his service, his fortune and situation were tolerably easy. But the being sometimes obliged to avail himself of the liberality of his generous friend, was a circumstance which humbled and mortified him beyond any other. He could not bear to reflect on being a burthen to her, for whom chiefly he wished to be rich, not only to exempt her from the expences which she incurred on his account, but to manifest his gratitude for the benefits she had already conferred on him.

His amiable friend tried every means in her power to set his mind at ease, concerning his obligations to her: assuring him that he had contributed much more to her professional fame than it had been in her power to do to his fortune; that she was in such circumstances as rendered the small friendly offices, which she had been able to perform, more a pleasure than an inconvenience; and pressed him, in the most urgent manner, to tranquillize his mind on that account, and to believe (which she assured him was the truth) that he was doing her the greatest favour, when he afforded her an opportunity of dividing with him her possessions.

The afflicted poet drew some comfort from these declarations, but it was of short duration. He was perpetually convinced of the ingratitude of his pretended Roman friends,

and the duplicity of his protectors; and having nourished in his soul an ardent passion for general esteem, respect, and admiration, his narrow circumstances threw him into so profound a fit of melancholy, that he became incapable of receiving consolation.

Such was his state of despondency in 1729, when, to his great astonishment, he received a letter from prince Pio of Savoy, inspector of the imperial theatre at Vienna, inviting him to engage in the service of the emperor Charles VI., as the successor of Apollonio Zeno, who, from the year 1718, had filled the place of imperial laureate, whose chief employment had been to furnish dramas for music; and these had been justly thought the bell which the Italian language could bear.

Metastasio was infinitely more surprised and flattered by this unsolicited and splendid offer, from finding that he had been recommended to the emperor's notice by the learned Zeno himself, who, growing in years, wished to retire to Venice, the place of his nativity, and had been applied to by his imperial majesty to recommend a successor.

And yet the offer of this employment to Metastasio, however dazzling, was not long productive of joy without deduction. The quitting Rome, for which he had always a filial fondness, as well as leaving his family, friends, and, perhaps more than all, the Romanina, impressed his mind with a sorrowful alloy to his happiness.

Upon consulting with his family, they instantly conceived such magnificent hopes of his future aggrandizement, as contributed much to their consolation at losing him; and the Romanina was so generous and disinterested, in spite of secret affliction, as to use her utmost eloquence in removing his doubts, and diminishing the causes of his repugnance, at quitting Rome and his friends.

After many consultations and discussions of the several arguments for and against the acceptance of the proposition from Vienna, the answer which he sent, and which has been printed among his letters, contains so many characteristic traits of modesty, propriety, and delicacy, that it deserves to be preserved as a model of conduct under similar circumstances.

The result of meditation, and the advice of his family and friends, was to accept the appointment, and to throw himself at the feet of his imperial master as soon as he could arrange his affairs, and fulfil his engagements to furnish the Roman theatre with two new operas for the ensuing carnival.

His appointment at Vienna was settled at three thousand florins *per annum*, and fifty pounds sterling for the expences of his journey. After completing his two new dramas for Rome, which were "Artaserse" and "Alessandro nell'Indie," and which were both set by Leonardo Vinci, and performed before the poet's departure, he left his native city with a heavy heart, and a most sovereign contempt for the friendship and flattering promises of the great, by whose delusions he had so long entertained hopes of preferment in his native city; whence, at last, he was driven into a kind of splendid banishment, for the rest of his life. These early disappointments, from being extremely credulous, rendered him incurably sceptical, as to all future passages of good fortune; and the effects of hoping too much in early life, and too little after, produced, perhaps, the principal defects in his character.

Upon quitting Rome, Metastasio consigned into the hands of his zealous and affectionate friend, the Romanina, all his effects, interests, and concerns; together with the management of his family affairs: she most willingly submitting to

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these several tasks, as well as to the care of the produce of the little places, and sums of money, which he left behind him.

Of his reception at Vienna, where he arrived in July, 1730, by prince Pio and his imperial patron, there is among his letters an account written by himself to a friend at Rome, the day after he had been presented. It was to the highest degree flattering. And the emperor, who was of a grave, religious, and moral character, seems to have honoured him not only with his favour but affection, on finding in him principles congenial with his own.

In his correspondence with the Romanina, we have an account of his occupations at Vienna, during the first three years of his residence there; and the reception of his operas of "Adriano in Siria," "Demetrio," "Iffipile," and his oratorio of "Sant' Elena al Calvario."

In 1734 he lost the friend of his head and heart, the Romanina, who died at Rome, and manifested the sincerity of her attachment to the poet, by bequeathing to him all her possessions, after the decease of her husband, to the amount of twenty-five thousand crowns. But Metastasio, always consistent with his usual rectitude and propriety, totally declined accepting of her intended kindness, and transferred the whole bequest to her husband, whose real property, according to our English ideas of jurisprudence, it seems legally to have been. The testamentary laws of Italy may be different from those of our country. Some Italian writers say, that the Romanina left Metastasio *erede di tutto il suo patrimonio*: "heir to all her patrimony." If by patrimony was meant an estate possessed by inheritance, and independently settled upon her at the time of her marriage, her testamentary dispositions are reconcilable to English ideas of law in such cases; though preferring the friend to the husband deviates somewhat from the general custom of our country. That the bequest was legal has never been doubted by Metastasio's biographers, who all speak of his renunciation in the highest terms of panegyric, as uncommonly disinterested, generous, and heroic. And the poet himself, as well as all Italy, regarded it as a noble sacrifice.

Whether Metastasio's connection with the Romanina was purely platonic, or of a less seraphic nature, we shall not attempt to determine. But the husband residing with them both at Naples and Rome, and the friendly manner in which the poet always mentioned him in his letters to the wife, and the openness with which he expressed his affliction in writing to him after her death, would, in England, be thought indications favourable to conjugal felicity. But a chaste actress or opera singer is still a more rare phenomenon in Italy than in Great Britain.

Yet though it is not thought absolutely necessary for the female singers of Italy to be vestals while single, or Lucretias when married, they find it convenient to have a nominal husband, who will fight their battles, contend with the first man, and impresario of an opera; and, occasionally, stand in the gap, as circumstances may require.

But whether the poet's friendship for Bulgarini, the husband, was pure and undisssembled or not, his affliction for the death of his wife seems to have been unfeignedly deep and sincere. The following pathetic letter, written immediately after he had received the news of her decease, and of her testament in his favour, seems a faithful delineation of the state of his mind at this time, and to correspond with that goodness of heart, as well as those tender feelings and lofty ideas of rectitude, which appear in all his other writings, and which have ennobled the general tenor of his life.

"To signor Domenico Bulgarini.

"Oppressed by the afflicting news of the death of our poor Marianna, I know not how to begin this letter. The tidings are intolerable to me on so many accounts, that I can devise no means to diminish the acuteness of my sufferings; and, therefore, I trust you will not accuse me of want of feeling, if I am unable to suggest to you any consolation for your loss, as I have hitherto been utterly unequal to finding any for myself.

"The last disposition of the poor deceased in my favour aggravates the cause of my sorrow, and obliges me to give a public and incontestable proof of the disinterestedness of that friendship, which I professed to her while living, and which I shall preserve for her honoured memory to the last moment of my existence. Knowing, therefore, how much affection, kindness, and zeal, for the welfare of the poor Marianna, you have always manifested, I shall best shew my gratitude to her, by entirely renouncing, in your favour, all claim to her effects; not through pride, God preserve me from such ingratitude! but because it appears to be my duty, as an honest man and a Christian. The advantage which I shall still derive from this inheritance, even after renouncing it, will not be inconsiderable: as the knowing what was intended for me by the generous testatrix will be a lasting proof of her friendship; and the relinquishing it in your favour will be a proof of my disinterestedness with respect to her, and of my equity towards yourself. I am at present, thank God, in no need of such assistance, as I am rewarded beyond my merit; so that I shall not suffer by the sacrifice I make to you. Though I entangle you with no conditions in the renunciation which I enclose, yet I have some requests to make, and counsels to suggest to you.

"My first request is, that the relinquishing this claim may in no wise dissolve our friendship; but that, according to the wish of the poor Marianna, our correspondence may continue as entire as if she were still living; substituting you at all times, and in all places, for her representative.

"My second request is, that you will undertake the trouble of receiving the salaries of my three offices in Rome, and the transacting of my Neapolitan concerns, exactly in the same manner as was done by our incomparable Marianna; for which purpose, I send you proper powers. I write likewise to signor Tenerelli, at Naples, who will treat you in the same manner as signora Marianna herself; remitting to you, from time to time, whatever sums may be due to me from that quarter, continuing to my poor family the usual assignments and provision, if you shall chuse it, jointly with my brother.

"The advice which seems necessary for me to give you is, that you would assist the poor family of signor Francesco Lombardi, by every means in your power; and try by acts of charity to do every thing for them, which, in a similar situation, you would expect from them to you. I have specified in my renunciation some particulars in which you should assist them; but besides my unwillingness to involve you in trouble and difficulty, I am so certain of the goodness of your heart, that I have left all the merit of your benevolence towards them to the liberality of your own determination.

"In all things else, you are at full liberty to act as occasion, and your own prudence, shall suggest.

"At present, my mind is in too great perturbation for me to attempt giving you a plan for the regulation of your conduct. I shall only say, that it appears to me, as if you should dispose of all the effects you can spare, in order to raise a capital, and that you should live in a smaller house.

"I can

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"I can think of no other testimony to offer you, at present, of my friendship and confidence. Be equally open in your correspondence, and consider my interests as your own, and me as your brother. I am unable now to write a longer letter: when my mind is more tranquil, I shall communicate to you such thoughts as may occur.

"In the mean time, love me, and endeavour to be comforted yourself. Be assured, if it were in my power, that I would try to contribute that to your consolation, which I am unable to receive myself."

In a letter to his brother Leopold, apologizing to him for the renunciation of the Romanina's intended kindness, he says, "I ought not to abuse the partiality of my poor deceased friend, at her husband's expence; and God, I trust, will permit me to prosper by some other means, for my integrity."

To a friend at Rome, on the subject of his affliction, he says, "I am now placed in the world as in a populous desert, and in that kind of desolation in which a man, if he were transported in his sleep to China or Tartary, would find himself in waking, among people of whose language, inclinations, and manners, he was quite ignorant."

If platonic affection can subsist in human nature, we may suppose it possible, perhaps, to have been realized between the poet and such a female friend as the Romanina; who, by what we can gather from Metastasio's letters, seems to have possessed a strong mind and great rectitude of heart.

The solemn manner in which so pious and moral a man as Metastasio says in his letter to a Roman friend, "In the midst of my gloomy imaginations, reason enough is left to tell me who, and what I am; but that is not sufficient to free me from affliction. May God, in whose hands are all events, turn this affliction to my benefit, and teach me by such a manifestation, what a vain hope it is to form systems of happiness, without his assistance." The late Mr. Mason, on reading this passage, regarded it as a proof that there had been nothing criminal between them.—"Such a man as Metastasio, writing to a friend, would have expressed in this place some compunction, at least he would not have invoked the Deity in such a solemn manner."

We have dwelt the longer on this incident in the poet's life, which places him, like Alcides, between virtue and vice, in hopes that a character, so exemplary during every other period of his existence, may, for the honour of humanity, descend spotless to posterity. In all other respects, his private virtues merit equal praise with his poetry, which has so long delighted the most polished and refined inhabitants of Europe.

Among the anecdotes, indeed, that were published after his decease, concerning the private life of our admirable bard, some peculiarities have been related, which seem too serious for ridicule, and from which we should be sorry, for his honour, and for the honour of human nature, not to be able to defend him. What a disgrace to practical virtue and benevolence would it be, to find a writer, whose works breathe the purest principles of virtue and morality, and whose life, during his long residence at Vienna, was unimpeachably innocent, and constant in the exercise of religious duties, to want, not only filial and fraternal affection, but even those common and laudable partialities for his kindred and countrymen, to which the most vulgar minds are naturally prone! It has been said with a degree of levity, perhaps more to enliven a period than from conviction, or a wish to degrade the poet's moral character, that "he refused to hear, and took pains not to know, whether he had, in his latter days, any relation left in the world." But in his correspondence, published by his executor signor Giu-

seppe Martinetz, aulic counsellor, and first keeper of the imperial library, there are letters to his father and brother, so full of filial and fraternal affection, as completely confute such hasty and unjust charges.

The year 1733 seems to have been extremely fertile in the Parnassian domains of our bard. Not only the operas of "L'Olympiade" and "Demofonte," with the oratorio of "Giuseppe Riconosciuto," but his charming canzonet, "La Liberta," were all productions of this year. This celebrated canzonet, "Grazie agl'inganni tuoi," was first set by the poet himself, but soon after by all the great composers of Italy, as a Venetian ballad, a canzonet, a duo, and a cantata, to much more elaborate and fanciful music than that of the poet: yet his own melody, which has been composed more than seventy years, has still its merit; and, compared with airs of the same period and kind, is superior to most of them in elegant simplicity.

In 1734, besides his usual occupations, we find, by his letters, that he was obliged, in the greatest haste, to write an entertainment for music, to be performed by the archduchesses, and to instruct, direct, and assist them. "But in truth," he says, "it is a pleasure which no other can equal, to have such an opportunity of seeing and admiring the excellent qualities of these august princesses. I should not else have believed it possible to meet with such attention, docility, patience, and gratitude. Oh, how many people, of the sixteenth rank, have I known, who were not possessed of the thousandth part of the courtesy of these incomparable personages! They have acted and sung like angels, and it was truly sacrilege, that the whole world was not permitted to admire them; for the festival was extremely private, as none but the Vienna ladies of the highest rank were able to obtain admission, and even these were in masks. As a return for instructing their serene highnesses, I was presented with a gold snuff-box, of about fourscore hungheri (near 40*l.*) in weight; but the workmanship is of much more value."

This little dramatic poem was called "Le Grazie Vendicate," set by Caldara, and performed by the two archduchesses, Maria Teresa, afterwards empress-queen, and her sister Marianne, with another lady of the court.

In the year 1734 he produced, for the emperor's birthday, "La Clemenza di Tito."

It seems as if the character and court of Charles VI. had directed the muse of Metastasio to chuse a virtuous prince for the principal hero of most of the musical dramas that were represented in the imperial theatre. The emperor was a religious prince, and a rigid observer of decorum himself, which consequently kept licentiousness at a distance from his court. And the poet, naturally a friend to virtue and morality, seems to have gratified his own feelings, by conforming to the serious sentiments of his imperial patron.

In 1735 he produced, by command of the empress Elizabeth, a little opera, with three characters only, entitled "Leinesi," for the same two archduchesses and a lady of the court to perform, as an introduction to a Chinese ballet.

The same year he furnished "Il Palladio conservato," and "Il Sogno di Scipione," pieces written for the celebration of the emperor and empress's name-day. These were a kind of birth-day odes, but in a dramatic form, in which the praise was delicately disguised in a fable or allegory.

In 1736, his "Themistocles," set by Caldara, first appeared; but while this was performing, Metastasio had another task assigned him, the difficulties of which he frequently related to his friends, many years after.

To Betinelli, the printer, he writes: "I send you a copy

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of the opera of 'Achille in Sciro,' which I have been obliged to write in eighteen days and a half, for the nuptials of the archduchess Teresa with the duke of Lorraine. Three months, which I used to allow myself for writing an opera, were never sufficient to finish it to my mind: imagine whether it was possible to satisfy myself with this."

The admirable drama of "Ciro Riconosciuto" was a production of this period.

It seems as if 1737 had been a sabbatical year for our author and his muse; for none of his poetical works bear that date, nor do any of his letters of that period appear in the collection.

In 1738 and 1739 he produced several small occasional pieces, chiefly for the archduchesses to perform; which, though elegantly written, have not been of that general use to the rest of Europe, which fell to the lot of most of his operas on a larger scale, for want of length and more characters.

In 1740, however, his dramatic muse was better employed, and more propitious: for, besides the opera of "Zenobia," and the oratorio of "Ifacco," he wrote "Il Natale di Giove," and the opera of "Attilio Regolo," for the birth-day of the emperor Charles VI.; but that prince dying before it had been represented, it was laid aside, and not performed till 1750, when it was set by Hasse, for the court of Dresden.

The poet laments the death of his patron with great sensibility, in a letter to a friend. Indeed it was a calamity to all Europe, by the general war which immediately ensued.

This prince found in Metastasio a man who encouraged and confirmed his love of virtue, decorum, and propriety; and Metastasio found in his patron a prince susceptible of receiving his recommendations of the moral and social, as well as the heroic virtues. Indeed the poet and the patron seem to have been formed for each other.

Between the death of this emperor, in 1740, and 1745, when prince Charles of Lorraine, consort to the empress-queen, was elected emperor, by the title of Francis I., the court of Vienna had little leisure for being amused by the peaceful arts of poetry and music. We find, among the poet's works, but two complete dramas written during all that time: "Antigono," and "Ipermestra." One of these, "Antigono," was written expressly for the court of Dresden. Both were set by Hasse, who ranked high in the favour of Metastasio, as a great composer and intelligent man.

Our author's poetical productions in 1746 consist only of his two beautiful canzonette, "La Partenza," and "La Palinodia a Nice," thirteen years after he had so piously and elegantly thanked the gods for discovering to him her infidelities, in his "Grazie agl' inganni tuoi."

His correspondence with the celebrated Farinelli began in 1747, to whom 38 of his letters are addressed, in the sixth volume of his correspondence, which seem the most affectionate and confidential in the collection. The poet and musician were nearly of the same age. And having begun their career of fame and fortune together at Naples, in 1723, they, from that circumstance, ever after called each other *Gemello*, or *Twin*, in their correspondence, which lasted to the end of their lives. Many of the poet's letters were addressed to the great singer at Madrid, where, during two successive reigns, he enjoyed the highest favour. See FARINELLI.

The blessings of peace, after the seven years' war, revived at Vienna the innocent pleasures of the lyric theatre; and in 1751 produced Metastasio's beautiful opera of "Il

Re Pastore," which was followed, in 1752, by "l'Eroe Cinese." These were performed in the imperial theatre by persons of the highest distinction, some of whom are said greatly to have surpassed, in many particulars, professed opera singers of the first rank.

In 1756, at the request of his friend Farinelli, and with the permission of his imperial patrons, he furnished the court of Spain with a new opera, entitled "Nitteti," which was brought on the stage there, with the utmost splendour and magnificence, under Farinelli's direction.

The last three operas written by Metastasio, were "Il Trionfo di Clelia," in 1762; "Remolo ed Ersilia," 1765; and "Il Ruggiero," in 1771; which were performed at three several places: the first at Vienna, on the delivery of Isabella of Bourbon, first consort of the emperor Joseph II.; the next at Innebruck, on the marriage of the grand duke of Tuscany with Maria, Infanta of Spain; and the last at Milan, on the nuptials of the archduke Ferdinand with Beatrice, princess of Modena, which terminated the dramatic labours of our admirable lyric bard.

His other poetical compositions, which are very numerous, consist of oratorios, occasional short lyric pieces, hymns, and sacred songs, cantatas, epithalamia, sonnets, canzoni, complimentary verses, &c., all replete with elegance, refined ideas, and every beauty of numbers which the Italian language so copiously can furnish, and melody requires.

Among his prose writings, the extracts from Aristotle's Poetics, and the *Ars Poetica* of Horace, are the principal; and these will long remain indisputable proofs of his learning, good taste, and perfect comprehension of the laws prescribed by these great masters, which he explains with the utmost clearness and practical utility; giving sense to many passages that were thought obscure and unintelligible.

In all his productions, religion, government, sound policy, morals, manners, and even innocent prejudices, are so highly respected, that the most extreme delicacy never finds the least sentiment that can offend or alarm. His doctrines and practice in these particulars so perfectly agreed, that he constantly discountenanced in conversation all tendency to licence, disrespect, and disputation on moral and sacred subjects, though naturally cheerful, and pleasantly metaphorical, in his conversation. This being his invariable practice during his long residence at Vienna, excited as much eagerness in travellers of all ranks to see and converse with him, as the renown which he had justly acquired by his writings.

He was honoured with testimonies of respect and admiration from almost all the sovereigns in Europe, where the Italian language and music were known, which he received with the utmost humility and gratitude.

Such were the delicacy and constancy of his friendly attachments and intercourse, that death could only dissolve them. The princess di Belmonte Pignatelli, the countess d'Althan of the same illustrious family, who knew and patronised him in his early youth; count Canale, baron Hagen, and count Perlas, who spent all their evenings with him at Vienna during their several lives; Farinelli, his correspondent of 50 years duration, count Algarotti, and his brother, the advocate, Leopoldo, to whom 48 of his letters are extant; all these affections were habitual and deeply rooted in his heart.

His whole life appears to have been of that even tenour, which nothing but great accidents or public calamities could disturb. His veneration and gratitude for his patrons, the empress-queen, seem, during the last years of his life, to have been the strongest passions to which he gave admission

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in his breast. When unfortunate in war, or on account of the sickness or death of any of her family, he was as much agitated as any of her most faithful and best subjects. But when her own life was endangered by disease, his equanimity and philosophy totally left him. Then yielding to the natural sensibility and tenderness of a heart, neither chilled by apathy, nor petrified by stoicism, he became a common man; not too flulborn for affliction, or too proud and obdurate for the impressions of calamity. The sickness of his brother, and death of the countess d'Altham, are likewise illustrations of this occasional sensibility.

His conversation was usually scientific, turning on new discoveries, new books, pleasing events, but rarely on calamity or unpleasant topics. By this means he kept his passions and affections in equilibrio, obtained prosperity in youth, and veneration in old age.

Though his longevity had extended to 84, yet his faculties were so entire, his person so free from any appearance of decrepitude, still possessing a florid countenance, and his accustom'd eloquence, and playful language in conversation, that he was expected to have many years more; but on the 11th of April, 1782, returning from his constant evening visit to count Perlas, he complained of a chilliness, eat very little at supper, and went to bed at his usual hour of 12 o'clock. "The next morning, (says mademoiselle Martinetz in her letter to Farinelli, giving him an account of his friend's decease,) he called for my elder brother, Giuseppe, and consulted him whether he had best rite a d go to church, as he had intended, it being Easter Sunday; but was advised by him to remain in bed, as his pulse was very quick; an hour after the fever increased to such a degree, that it deprived him of speech, and he remained oppressed by a heavy lethargic sleep, which continued during two days, with short intervals, in which he was only able to take the medicines prescribed by Dr. Molinari, his physician. The fever diminished so much on the morning of the fifth day, that he became tranquil, spoke freely, conversed with some of his friends, who visited him, and was able, after dinner, to have the sacrament administered to him. You may imagine, sir, what great consolation this afforded us; but our hopes were of short duration, for at night the fever returned with such violence, that every day he became more lethargic, and baffled all the skill of the most able physicians, who met in consultation; so that on the 12th of April, between 11 and 12 o'clock at night, he finally, without much agony, expired."

Metastasio, lamented by all who knew or had heard of him at Vienna, was interred at the parish church of St. Michael, the 14th of April. The funeral rites were performed with splendour, by his grateful heir, signor Joseph Martinetz, in despite of the poet's injunctions, who had forbidden all kind of pomp. The inheritance of signor Martinetz consisted in a well-furnished habitation, a coach, horses, a great quantity of princely presents, a very ample and select collection of books, with a capital of 130,000 florins; from which, however, were to be deducted, 20,000 for each of the executor's sisters, and 3000 for each of his younger brothers.

The poet's attachment to the Martinetz family was of long standing. In the year 1730, on his arrival at Vienna, the first house in which he took up his residence, was that of signor Nicolò Martinetz, master of the ceremonies to the apostolic nuncio in that city. The eldest son of this gentleman he appointed his heir, jointly with his eldest sister, signora Marianna Martinetz, educated under his eye, and universally admired for her talents and accomplishments, particularly in music, not only as an excellent performer on

the harpsichord, and an exquisite singer, but for her genius and ability in composition, she was an elevè of the great Dr. Hayer, who resided three years under the same roof with Metastasio during her musical studies; and had lessons in singing from the celebrated Porpora, who had many years before been the poet's own music-maister. The productions of mademoiselle Martinetz were communicated to, and approved by the greatest masters of Italy, and her name is inscribed a member of the Philharmonic academy in Bologna and Mantua.

Signor Saverio Martinetz, the most useful of Metastasio's biographers, though he rather gives advice to others, with loose and indigested materials, than a regular life of the poet, says, that "whoever wishes to acquire an exact knowledge of his customs, manners, way of life, opinions of himself and others; of his precision in fulfilling his duties, of the changes in his fortune, his application, and the different degrees of favour with which his several productions were at first received, their chronology, the influence they had on the taste of Italy, and on that of all Europe, with respect to the mel-drama, or lyric stage, can only acquire such information by the perusal of his Letters."

"His Letters (says the abate Crivini, the most accurate and ample of all his biographers, and editor of the Nice edition of his works) will do honour to all Italy, while they discover his most intimate attachments, his most secret thoughts, his favourite opinions, and the history of a man who was all heart and all virtue."

"His genius (says signor Arteaga, *Revol. del Theatro Mus. Ital.*) may be compared to the goddess Chloris of the Greeks, who, in flying through the air, scattered roses wherever she went." The same grace, facility, and elegance of style appear in his prose, as have rendered his poetry so justly celebrated. Till we saw these Letters, we used to think that there was no Italian prose so easy to comprehend and construe, by young students in the language, as the dramas of Metastasio; but we are now convinced, that, in point of facility, the prose of our author is to his own poetry, what the prose of others is to their verse.

What renders these Letters infinitely more natural and satisfactory is, that, like the *Epistolæ Familiæ* of Cicero, they were not written with the least view to publication; as is manifest by the lively complaints which he makes to his correspondents, who, for the gratification of their own vanity, had betrayed his confidence.

Few writers have been fortunate enough to enjoy the favour of the public so completely during their lives as Metastasio. But this felicity is not to be more ascribed, perhaps, to the excellence of his writings, than to his modesty, candour, and determination neither to give nor take offence by censuring the productions of others, or resenting the censures of his own. He seems to have seen, with due horror, the effects of literary war on the combatants.

That celebrity which he enjoyed so indisputably during life, was not diminished by his decease; his works are still in every hand: the philosopher, the courtier, the bigot, the man of the world, austere and gallant females, all equally read them, and all find them equally beautiful. His moral maxims are daily cited, and his productions are become the code of lovers. The setting and singing his verses, have rendered Pergolesi, Vinci, Jomelli, Sacchini, and Farinelli, Caffarelli, Pacchierotti, and Marchesi, as celebrated in all parts of Europe, as Corneille, Racine and Voltaire. Had his dramas been regular tragedies, written for declamation, without music, perhaps we should never have heard of them in England: but music being an universal language throughout Europe, they are certainly obliged to the composer and singer

finger for a great part of their fame, at least out of Italy, notwithstanding the complaints of Metastasio himself, and the admirers of tragedy, who are inimical to music, that they have been injured by composers and performers. Particular operas, and perhaps, at some time or other, all his dramas, may have fallen into the hands of composers without genius, and singers without talents; but upon the whole, excellently written as are Metastasio's dramas, and exquisite as is the Italian language, it must be owned, that music has been the vehicle in which the operas of Metastasio have travelled into foreign countries. Cato, Regulus, Themistocles, Artaxerxes, Olimpiade, and Demofoonte, are allowed to breathe a true tragic spirit, even through the effeminate languor of lengthened tones and long divisions; but it is in the perusal, perhaps, not the vocal performance, that the force and beauty of Metastasio's dramatic scenes have been discovered out of Italy. When an air has been encored, it has not been for the beauty of the poetry, but the composition or performance of that air. It must be allowed, however, without the least deduction, that Metastasio's genius, good taste, and sound judgment, first achieved the difficult task of rendering so wild and incongruous a compound of seemingly heterogeneous ingredients and absurdities, as an *opera*, a rational entertainment.

Even the church has defended the morality of Metastasio's dramas. The ci-devant Jesuit, father Cordaro, in his eulogy of our poet, says, "I well know that he has been accused by some of having brought the passion of love too forward in his dramas, at the risk of seducing and enervating the heart and virtue of the hearers. How shall we defend him from this charge? He would certainly have done better, if he could have confined himself to the love of glory, and of our country, in displaying the virtues of valour, fidelity, and constancy, without meddling with the follies of lovers. But there are certain noble affections, concerning which, the vulgar have but little knowledge, and less taste. On the contrary, every one understands love; and without that seasoning every representation, at present, seems insipid. It is the predominant passion of the times. He was perhaps necessitated to comply with it; but with what precaution and reserve! Has an unchaste word ever escaped him? Or an idea that is not strictly within the limits of the most perfect delicacy? This may be said of his secular dramas taken from profane story; but his sacred dramas are not only exempt from blame with respect to the passion of love, but sufficiently pure in morals and doctrine, to serve as correctives to whatever the most morose critics may object to his productions for the stage."

The chronology and *moral object* of each drama is indicated in the English Memoirs of his Life and Writings, vol. iii. p. 316. &c.

We dare extend this article no farther. Our biographical articles should doubtless, in general, be confined to the battles of heroes, and books of the learned; but Metastasio's private character, meriting as much display as his public productions, we could not in our sketch of his life help stopping on the road to look about us, and admire the beautiful views which a life well spent affords.

METASTASIS, in *Medicine*, μεταστασις, signifies a translation or transition of disease from one part of the body to another, the part first affected recovering its natural functions at the time when the other begins to be diseased.

These transitions of disease have been noticed from the earliest history of the practice of medicine; and the writings of Hippocrates abound with instances of the fact, and with practical precepts, deduced from a careful observation of the

consequences that ensue under the various circumstances of their occurrence. The older writers, who ascribed all diseases to the existence of a morbid matter, which, in whatever part it prevailed, gave rise to peculiar local symptoms, readily explained these instances of metastasis, upon the supposition that the morbid matter was substantially translated from the part first diseased to the seat of the new affection: indeed, this translation of the disease was deemed by them one of the proofs of the existence of a *materies morbi*. But we have already shewn, at some length, that the existence of such a morbid matter, as the efficient cause of diseases, is purely a gratuitous supposition, which more accurate investigation has exploded; and that the fact of the transition of disease by what has been called *metastasis*, although not easily explained upon any hypothesis, is as satisfactorily accounted for on the principle of sympathy, through the medium of the nervous system, which experiment has demonstrated, as upon the notion of an actual transference of morbid matter, which is hypothetically assumed. See *HUMORAL Pathology*.

It is scarcely necessary here to point out examples of the metastasis of diseases, which are universally recognised: such are the severe attacks of disorders in the stomach, when the inflammatory gout suddenly disappears from the extremities; the occurrence of diarrhœa or dysentery, upon the sudden retrocession of the measles, or other extensive eruption on the skin; the appearance of epileptic convulsions upon the cessation of the hæmorrhoidal, or other habitual discharge; the inflammation of the testes in men, or of the mammæ in women, which ensues, when that of the parotid glands in the disease called *mumps*, suddenly disappears; and other cases of a similar nature.

The transition by metastasis, however, is only one of several modes in which diseases are converted into each other. Of these we have already described the varieties in a former article, to which we refer the reader. See *CONVERSION of Diseases*.

METASTASIS, μεταστασις, *Remotio*, in *Rhetoric*, is used for the removing the blame from the person accused to another person, or laying it upon something as a cause. Thus, Adam's excusing himself by blaming Eve, is an example of the former; and the laying the crime of drunkenness upon the wine, is an instance of the latter.

METASTELMA, in *Botany, from μέλα, signifying a change, and στεῖμα, a crown, because the usual crown of the stamens being wanting, its place is supplied by a five-toothed appendage to the mouth of the corolla. Brown in Wern. Transf. v. 1. 52.—Class and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocinea*, Juss. *Asclepiadeæ*, Brown.*

Ess. Ch. Corolla bell-shaped; its mouth crowned with five prominent teeth, opposite to the sinuses, running down the tube. Crown of the stamens none. Anthers tipped with a membrane. Masses of pollen compressed, attached by their taper points, pendulous. Stigma pointless. Follicles. . . .

M. parviflorum. (*Cynanchum parviflorum*; Swartz Ind. Occ. 537. Willd. Sp. Pl. v. 1. 1258. *Periploca scandens*, nummulariæ foliis, flore albo; Plum. Ic. 209. t. 215. f. 1.) —Native of wild mountainous thickets in the West Indies, in various islands of which it was gathered by Plumier, Swartz, Masson, and Von Rohr. The stem is somewhat shrubby, twining to a great extent, subdivided, slender, bluntly quadrangular, smooth like every other part of the herbage; its branches thread-shaped, opposite, spreading, and twining. Leaves about an inch long, opposite, distant, stalked, ovate, entire, thin, smooth on both sides, with one rib, and several transverse veins, tipped with a minute,

rigid, awl-shaped point. *Umbels* nearly sessile between the footstalks, of about six or eight small, stalked, greenish-white *flowers*, whose segments are acute, finely downy, thickened at the edges, and reflexed. Mr. Brown complains of the inaccuracy of Dr. Swartz's description of the crown of the flower, and we have also to remark that the umbels are, as the former truly says, between the footstalks, not axillary; and the leaves have a very conspicuous rib, as well as numerous veins. The name was given by Dr. Solander, from whom, as well as Dr. Swartz, we have specimens.

METATARSIIUS, in *Anatomy*, the abductor minimi digiti pedis. See ABDUCTOR.

METATARSUM, in *Natural History*, a name given by authors to a sort of stone supposed to represent a human foot. See METAPEDIUM.

METATARSUS, in *Anatomy*, one of the divisions of the foot. See EXTREMITIES.

METATEPEC, in *Geography*, a town of Mexico, in the province of Guasteca; 50 miles S. of Panuco.

METATHESIS, *Μεταθεσις*, formed of *μετα*, *trans*, and *θεσις*, *position*, *transposition*, a grammatical figure, whereby letters or syllables of a word are transposed, or shifted out of their natural situation; as *Ewandre* for *Ewander*; *I pra* for *prai*.

METATHESIS, a word used by medical writers for a change of place in such humours, or other diseased parts, as cannot be absolutely removed or sent off. Thus a metathesis of a cataract is a depression thereof, so that it no longer shuts out the light.

METATOR, among the Romans, a quarter-master. Out of every legion a tribune, and some centurions, were appointed to go before the army, in order to choose a place for a camp, and assign and mark out quarters to each legion.

METAWAUMKEAG, in *Geography*, a large northerly branch of the river Penobscot, in America.

METCHICOT, a lake of Canada. N. lat. 50° 22'. W. long. 88° 30'.

METCHIGAMIAS, a long narrow lake, or rather dilatation of the northern branch of the river St. Francis, in Louisiana, which falls into the Mississippi from the N.W. about four miles above Kappas Old Fort.

METE, a small island in the Arabian sea, near the coast of Adel. N. lat. 11° 10'. See BABELMANDEB.

METEARA, a town of Hindoostan, in Bahar; 23 miles S.E. of Saferam.

METECAL, or METICAL, in *Commerce*, a weight for gold, silver, and diamonds, in the Levant. At Aleppo it is used for weighing pearls and ambergris, and is 1½ drachm, or 73 English grains. At Damascus, silver is sold by the ounce of 10 pesi, or 6¾ metecalli, weighing 19 dwt. 4 gr. English troy. At Smyrna, gold and silver lace is sold by the metical of 1½ drachm avoirdupois, or 72 grains troy weight, very nearly. See WEIGHTS.

METEGAVEL, in our *Old Writers*, a tribute or rent paid in victuals, which was a thing used in this kingdom, as well with the king's tenants as others, till the reign of king Henry I.

The word is Saxon, *metagavel*; i. e. *cibi gablum, seu vestigal*.

METELAR, in *Geography*, one of the Laccadive islands. N. lat. 12° 18'. E. long. 72° 25'.

METELE, a town of Lithuania, in the palatinate of Troki; 36 miles N. of Grodno.

METELEN, a town of Germany, in the bishopric of Munster; 19 miles N.W. of Munster. N. lat. 52° 14'. E. long. 7° 10'.

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METELIN. See MITYLENE.

METELINOS, a town of the island of Samos; 2 miles N.E. of Cora.

METELLUS, QUINTUS CÆCILIUS, in *Biography*, the son of L. Cæcilius Metellus Calvus, was raised to the consulate, during the Jugurthine war, with M. Junius Silanus, in the year B. C. 109. On calling lots for the consular provinces, that of Numidia fell to Metellus, who made immediate preparations for retrieving the honour of the Roman arms, which had lately fallen into disgrace through the successes of Jugurtha. He was extremely careful in the selection of the officers to serve under him, and chose, among others, of known military talents, the famous Marius, who, for want of interest, had for some time remained unemployed at Rome. Having restored order and discipline in his army, he marched into the centre of Numidia, where he defeated and dispersed the whole force commanded by Jugurtha in person. When the consular year was ended, the command was continued to Metellus as pro-consul, and he pursued the plan of ruining the country of Jugurtha, and cutting off his resources. At length the circumstances of the Numidian obliged him to enter into a treaty with Metellus, by which he delivered up all his elephants, a number of horses and arms, and all the deserters from the Roman army. The latter, to the disgrace of the conqueror, were put to death, with great cruelty. Jugurtha took the first opportunity of appearing again in arms, and the people rose upon a Roman garrison, and massacred the whole, excepting the commander Turpilius. Metellus soon recovered the place, brought Turpilius to a court martial, and caused him to be put to death, on account of which he underwent the keenest remorse: having been influenced in his decision rather by popular clamour than by the strict rules of justice. Marius had been a leading actor in the condemnation of Turpilius, and triumphed in the consequences which it had upon the mind of Metellus, whose character with the people he endeavoured to injure. The third year of his command was going on, and nothing decisive had been effected. Of this his rival, Marius, made a handle, and by his representations to the people was able, not only to procure his own election to the consulate, but to obtain a decree for his superseding Metellus in the conduct of the Numidian war. Metellus deplored his hard fate with tears. He refused to see his rival; delivered up his army by a lieutenant, and immediately embarked for Rome. He was received with great honour by his friends and partizans, who obtained for him the honour of a triumph. Being charged with peculation by a tribune, he would have produced his books in his own justification; but the Roman knights who sat as his judges refused to examine his accounts, declaring that they considered the whole tenor of his life as a sufficient testimonial of his innocence. Having passed with honour through his military career, there remained a trial of his civic virtue and firmness, in which he obtained equal credit. In the year B. C. 100, the most violent measures were carried on by the popular leaders; and the tribune Apuleius Saturninus having prepared an Agrarian law, procured a clause to be previously passed, that the senate would swear to confirm whatever the people should enact. Metellus opposed the proposition; the senate, to a man, joined in a similar opposition. Marius, who had led them to this determination, by pretending to entertain the same sentiments, soon retracted, and took the oath; all the senators, excepting Metellus, followed his example. Metellus persisting in his resolution was condemned to banishment. His friends offered to oppose this act of injustice, but he declared that not a drop of blood should be spilt on his account. He said, "either the state of public affairs will change, and I shall be recalled; or, if they remain

as they are, I shall be better off any where than at Rome." He then passed over to Rhodes, or Smyrna, where he passed his time in the study of philosophy. In the following year, a decree was passed by a great majority for his return: the news was brought to him while he was assisting at some public games, and though he was informed that the packet contained pleasing intelligence, he would not open it till the spectacle, perhaps a religious ceremony, was over. On his return to Rome he was met at the gates by all the persons of distinction in the city, and was accompanied to his house by great crowds of people, and at the next consular election the public esteem for him was shewn by accepting his recommendation of one of his own name and family. After this, we hear no more of this worthy man.

METEMPSYCHL, in *Church History*, heretics, who, in imitation of the Pythagoreans, maintained the transmigration of souls. See **METEMPSYCHOSIS**.

METEMPSYCHOSIS, *Μετεμψυχωση*, formed of *μετα*, *beyond*, and *εμψυχη*, *I animate*, or *enliven*, in the *Ancient Philosophy*, the passage or transmigration of the soul of a man, after death, into the body of some other animal.

Pythagoras and his followers held, that, after death, men's souls passed into other bodies, of this or that kind, according to the manner of life they had led. If they had been vicious, they were imprisoned in the bodies of miserable beasts, there to do penance for several ages; at the expiration whereof, they returned afresh to animate man. But if they had lived virtuously, some happier brute, or even a human creature, was to be their lot.

What led Pythagoras to this opinion was, the persuasion he had, that the soul was not of a perishable nature: whence he concluded, that it must remove into some other body upon its abandoning this. According to Empedocles, human souls, in the course of the transmigration to which they are liable, may inhabit not only different human bodies, but the body of any animal or plant. Lucan treats this doctrine as a kind of officious lie, contrived to mitigate the apprehension of death, by persuading men, that they only changed their lodging; and only ceased to live to begin a new life.

Reuchlin denies this doctrine; and maintains, that the metempsychosis of Pythagoras implied nothing more than a similitude of manners, desires, and studies, formerly existing in some person deceased, and now revived in another alive. Thus, when it was said, that Euphorbus was revived in Pythagoras, no more was meant than that the martial virtue, which had shone in Euphorbus at the time of the Trojan war, was now, in some measure, revived in Pythagoras, by reason of the great respect he bore for the athlete. For those people wondering how a philosopher should be so much taken with men of the sword, he palliated the matter, by saying, that the soul of Euphorbus, *i. e.* his genius, disposition, and inclinations, were revived in him. And this gave occasion to the report, that Euphorbus's soul, who perished in the Trojan war, had transmigrated into Pythagoras.

Ficinus asserts, that what Plato speaks of the migration of a human soul into a brute, is intended allegorically, and is to be understood only of the manners, affections, and habits, degenerated into a beastly nature by vice. Seranus, though he allows some force to this interpretation, yet inclines rather to understand the metempsychosis of a resurrection.

Pythagoras is said to have borrowed the notion of a metempsychosis from the Egyptians (see **EGYPT**); others say, from the ancient Brachmans. It is still retained among the Banians, and other idolaters, of India and China; and makes the principal foundation of their religion. (See **BRACHMANS**, **BANIAN**S, and **GENTO**S). So extremely are they

bigotted to it, that they not only forbear eating any thing that has life, but many of them even refuse to defend themselves from wild beasts. They burn no wood, lest some little animalcule should be in it; and are so very charitable, that they will redeem from the hands of strangers any animals that they find ready to be killed. See **ΠΥΘΑΓΟΡΕΑΝ**S.

METEMPTOSIS, from *μετα*, *post*, and *πειπω*, *cado*, *I fall*, a term in *Chronology*, expressing the solar equation, necessary to prevent the new moon from happening a day too late.

By which it stands contradistinguished from *proemptosis*, which signifies the lunar equation, necessary to prevent the new moon from happening a day too soon.

The new moons running a little backwards, that is, coming a day too soon at the end of three hundred and twelve years and a half; by the *proemptosis*, a day is added every three hundred years, and another every two thousand four hundred years; on the other hand, by the *metemptosis*, a bissextile is suppressed each one hundred and thirty-four years; that is, three times in four hundred years. These alterations are never made but at the end of each century; that period being very remarkable, and rendering the practice of the calendar easy.

There are three rules for making this addition, or suppression, of the bissextile day, and, by consequence, for changing the index of the epacts. 1. When there is a *metemptosis* without a *proemptosis*, the next following, or lower index, must be taken. 2. When there is a *proemptosis* without a *metemptosis*, the next preceding or superior index is to be taken. 3. When there are both a *metemptosis* and a *proemptosis*, or when there is neither the one nor the other, the same index is preserved. Thus, in 1600, we had D; in 1700, by reason of the *metemptosis*, C was taken; in 1800, there were both a *proemptosis* and a *metemptosis*; so the same index was retained. In 1900, there will be a *metemptosis* again, when B will be taken, which will be preserved in 2000, because there will then be neither the one nor the other. This is as far as we need compute for it: but Clavius has calculated a cycle of 301,800 years; at the end of which period, the same indices return in the same order. See **EPACT**.

METEOR, from *μετεωρος*, *high*, *sublime*, is a general term used to signify the transient, fiery appearances in the heavens; such as are denoted by the more particular names of *shooting stars*, *globes of fire*, *ignes fatui*, *aurora borealis*, &c. The word is used by some writers to signify all the various phenomena of the atmosphere, as *clouds*, *rain*, *hail*; &c. in which case meteors are divided into *fiery* and *watery*; but this last distinction is adopted by few. We shall under this head make a few observations upon the fiery meteors, or those more generally designated by the name meteor, and leave the other to be considered under the article **METEOR**LOGY.

The phenomena called *shooting* or *falling stars* have been seen by every one, as these meteors are visible in greater or less numbers every clear night; they need not therefore be particularly described. These meteors are so very transient, not often exceeding one or two seconds in duration, that they afford no opportunity for observations by which their altitude can be determined with accuracy, and consequently we are in a great measure ignorant of their height. If a few intelligent persons were to agree to make the best observations they could on the altitudes of these meteors some suitable evening, supposing the observers to be stationed at the distance of ten, twenty, or more miles from each other, and to have their watches, &c. duly adjusted, it is very probable that data

METEOR.

might be obtained to ascertain the height of these meteors, within certain limits at least.

Though the general appearance of these meteors is that of stars shooting or falling, yet they occasionally are observed of great magnitude and comparatively of long duration, sometimes almost as large as the moon, and move through a celestial arc of 100°, more or less. As an instance of this kind we may take the great meteor of August 18th, 1783, an account of which was given in the *Philos. Transact.* 1783, by the late Mr. Cavallo, from his own observations, and those of some intelligent friends who happened to be with him, at Windsor. "On the evening of the 18th of August 1783, we were standing upon the N.E. corner of the above-mentioned (Windsor) terrace. The weather was calm, and agreeably warm; the sky was serene, excepting very near the horizon, where a haziness just prevented the appearance of the stars. A narrow, rugged, and oblong cloud stood on the N.W. side of the heavens, reaching from the extremity of the haziness, which rose as high as 18 or 20 degrees, and stretching itself for several degrees towards the east, in a direction nearly parallel to the horizon. It was a little below this cloud, and consequently in the hazy part of the atmosphere, about the N. by W. half W. point of the compass, that this luminous meteor was first perceived. Some flashes of lambent light, much like the aurora borealis, were first observed on the northern part of the heavens, which were soon perceived to proceed from a roundish luminous body, nearly as big in diameter as the semidiameter of the moon, and almost stationary in the above-mentioned point of the heavens. It was then about 25 minutes after nine o'clock in the evening. The ball at first appeared of a faint bluish light, perhaps from being just kindled, or from its appearing through the haziness; but it gradually increased its light, and soon began to move, at first ascending above the horizon in an oblique direction towards the east. Its course in this direction was very short, perhaps of five or six degrees; after which it directed its course towards the east, and, moving in a direction nearly parallel to the horizon, reached as far as the S.E. by E. point, where it finally disappeared. The whole duration of the meteor was half a minute, or rather less; and the altitude of its track seemed to be about 25 degrees above the horizon. A short time after the beginning of its motion, the luminous body passed behind the above-mentioned small cloud, so that during this passage we observed only the light which was cast in the heavens from behind the cloud, without actually seeing the body from which it proceeded for about the sixth or at most the fifth part of its track; but as soon as the meteor emerged from behind the cloud, its light was prodigious. Every object appeared very distinct; the whole face of the country, in that beautiful prospect before the terrace, being instantly illuminated. At this moment the body of the meteor appeared of an oblong form; but it presently acquired a tail, and soon after it parted into several small bodies, each having a tail, or elongation; and all moving in the same direction, at a small distance from each other, and very little behind the principal body, the size of which was gradually reduced after this division. In this form the meteor moved as far as the S.E. by E. point, where the light decreasing rather abruptly, the whole disappeared.

"During the phenomenon no noise was heard by any of our company, excepting one person, who imagined to have heard a crackling noise, something like that which is produced by small wood when burning. But about ten minutes after the disappearance of the meteor, and when we were just going to retire from the terrace, we heard a rumbling noise, as if it were of thunder at a great distance, which in all pro-

bability was the report of the meteor's explosion; and it may be naturally imagined that this explosion happened when the meteor parted into small bodies, viz. at about the middle of its track.

"Now if that noise was really the report of the explosion which happened at the above-mentioned place; the distance, altitude, course, and other particulars relating to this meteor, must be very nearly such as are expressed in the following list; they being calculated with mathematical accuracy upon the preceding particulars, and upon the supposition that sound travels at the rate of 1150 feet per second. But if the noise we heard was not that of the meteor's explosion, then the following results must be considered as quite useless and erroneous.

Distance of the meteor from Windsor castle	}	130 miles
Length of the path it described in the heavens	}	550 miles.
Diameter of the luminous body, when it came out of the clouds	}	1070 yards.
Its height above the surface of the earth	}	56½ miles.

The explosion must have happened perpendicularly over Lincolnshire."

The above account was written the day after the appearance of the meteor; and in his *Natural Philosophy* this author farther observes, "Those accounts which were sent from various parts of this island, as also from the continent, confirmed, as nearly as can be expected, the above-mentioned results respecting its size, velocity, elevation, and explosion over Lincolnshire; but this meteor must have certainly had its origin much farther north than we imagined; and indeed, on account of the intervening cloud, it was impossible for us to perceive it at an earlier part of its course. It is also probable that it must have gone or terminated at a much greater distance than it appeared to us; for as its light diminished until it vanished, we must naturally have lost sight of it sooner than those who stood farther south on the continent. The various accounts seem to establish, that its course commenced beyond the northern extremity of this island, probably somewhere over the northern ocean. It passed a little westward of Perth, and perhaps a little eastward of Edinburgh; it proceeded over the south of Scotland, Northumberland, the bishopric of Durham, Yorkshire, Lincolnshire, over which it seemed to have deviated gradually to the westward, and in the course of that deviation to have suffered the bursting or partition. It then passed over Cambridgeshire, Essex, and the straits of Dover, entering the continent probably not far from Dunkirk, where, as well as at Calais and Ostend, it was thought to be vertical. It was seen at Brussels, Paris, Nuits in Burgundy, and, it is said, even at Rome. Upon the whole, it must have described a track upwards of 1000 miles in about half a minute; an astonishing rate of going, vastly swifter than the motion of sound." Vol. iv. p. 363.

In corroboration of the general accuracy of the above account, the author of this article may add his testimony, having been a witness of the meteor nearly during the whole of its apparition from Kendal in Westmoreland, a place, as it should seem from the above account, situated near to the middle of the meteor's track. The meteor, as seen from thence, rose near the N.W., moved nearly in the direction of the magnetic meridian, and disappeared in the S.E. The apparent velocity was least at first and at last, and greatest during the middle or highest part of the track; but the variation was not more than what would arise from a really uniform

velocity, owing to the optical illusion in such case. The greatest altitude of the meteor seemed to be very nearly 50° , and its duration was about half a minute, more or less; its altitude, when first seen, might be about 15° or 20° , and nearly the same at its disappearance. The sky was quite clear, except a haziness in the S.E. horizon; the twilight was considerable; yet the first attention to the meteor arose from observing the moving shadow of a window frame. No subsequent report was heard; but this might be from the attention being at that time otherwise engaged. From a comparison of observations at different places, its height was estimated to be about 60 miles.

Upon the whole it may be pretty safely concluded, that the height of this meteor was not less than 50, nor more than 60 miles above the earth's surface; and that its motion was nearly in a horizontal direction during the whole of its course.

From the general resemblance of the small meteors or shooting stars to the large globes of fire, except in size and duration, it can scarcely be doubted that they are of the same nature. Whatever hypothesis may be laid down to explain the one, must be expected to apply to the other; and if the results of the recent observations and investigations respecting the stones fallen from the atmosphere are to be credited, these last phenomena are intimately connected with the former.

Dr. Halley conjectured, that a stratum or train of inflammable vapour, gradually raised from the earth, and accumulated in an elevated region, suddenly took fire at one end, and burning like a train of gunpowder, exhibited the meteoric phenomena. (Philos. Trans. vol. 30. N 360.) But this notion appears to have been entirely laid aside, as altogether untenable.

In later times, since the discoveries in electricity, meteors have been very generally ascribed to that agent. There seem, however, insuperable difficulties in explaining their phenomena upon electrical principles. The air, at the height of fifty miles, is probably 30,000 times more rarified than at the earth's surface; in such circumstances, we are almost certain that the electric fluid would either not pass at all, or pass in a very thin, attenuated state, so as to be far from exhibiting that densely luminous appearance which accompanies all the meteors in the form of balls. But admitting that large dense balls of electric fluid could be formed and conveyed through these high regions of the atmosphere, we should still be at a loss for materials to form those ponderable metallic masses which seem occasionally to be precipitated upon the surface of the earth, after the appearance of the meteor.

Professor Clap, late president of Yale college, in New England, in his theory of meteors, supposes them to be "terrestrial comets, revolving about the earth in the same manner as the solar comets revolve about the sun. That moving in very excentric orbits, when in perigee, they pass through the atmosphere, are highly electrified, and consequently become luminous. As they approach their lower apside, their electricity is discharged, the body disappears, and a report is heard. This being admitted, it is not strange that, by the violence of the shock, portions of the meteor should be thrown to the earth, while the main body, not sensibly affected by so small a loss, continues to move on in its orbit, and of course ceases to be luminous." Silliman on Meteoric Stones, American Philos. Trans. vol. 6. p 335.

In the Philos. Transact. 1784, Dr. Blagden has given "An account of some late fiery meteors; with observations." He considers the meteors under the following heads, in all of which he makes various appropriate observations.

1. Their general appearance.
2. Their path.
3. Their shape

- or figure.
4. Their light and colours.
5. Their height.
6. Their noise.
7. Their size.
8. Their duration: and,
9. Their velocity.

In discussing the opinions of philosophers on the subject, he refers to professor Clap's, as follows: "A strong objection to this hypothesis of permanent revolving bodies, is derived from the great number of them there must be to answer all the appearances. Such a regular gradation is observed from these large meteors, which strike all beholders with astonishment, and occur but rarely, down to the minute fires, called shooting stars, which are seen without being regarded in great numbers every clear night, that it seems impossible to draw any line of distinction between them, or deny that they are all of the same nature. But such a crowd of revolving bodies could scarcely fail to announce their existence by some other means than merely a luminous train in the night, as for instance, by meeting or jostling sometimes near the earth, or by falling to the earth in consequence of various accidents; at least one might expect they would be seen in the day-time, either with the naked eye, or telescopes, by some of the numerous observers who are constantly examining the heavens. Another argument of great weight against the hypothesis that fire-balls are terrestrial comets, is taken from the great velocity. A body falling from infinite space towards the earth, would have acquired a velocity of no more than seven miles a second, when it came within 50 miles of the earth's surface; whereas these meteors seem to move at least three times faster. And this objection, if there be no mistake in regard to the velocity of the meteors, as I think there is not, absolutely oversets the whole hypothesis." Page 223.

Dr. Blagden proceeds to explain these meteors on the hypothesis that they are electrical phenomena. His arguments are; 1st. From the great rapidity of their motion, which seems to exceed any other we are acquainted with besides that of electricity. 2dly. From certain electrical phenomena, which sometimes accompany these meteors; and 3dly. From the connection which they have with the aurora borealis, or northern lights. These last are well known to regard the magnetic meridian; and most of the great meteors have been observed to move in a direction nearly coincident with the same meridian. Upon this head he observes; "the tendency towards the magnetic meridian, however, seems to hold good only with regard to the largest sort of fire-balls; the smaller ones move more irregularly, perhaps because they come further within the verge of our atmosphere, and are thereby more exposed to the action of extraneous causes. That the smaller sort of meteors, such as shooting stars, are really lower down in the atmosphere, is rendered very probable by their swifter apparent motion; perhaps it is this very circumstance which occasions them to be smaller, the electric fluid being more divided in more resisting air. But as these masses of electricity, which move where there is scarcely any resistance, so generally affect the direction of the magnetic meridian, the ideas which have been entertained of some analogy between these two obscure powers of nature, seem not altogether without foundation." P. 230.

Dr. Blagden concludes, that there are three regions of the atmosphere, distinguished by electrical phenomena peculiar to each. 1st. The lowest region, in which the phenomena of thunder and lightning occur. 2dly. The middle region, where the fire-balls and shooting stars are observed; and, 3dly. The highest region, where the aurora borealis displays a peculiar kind of electric agency.

Though many of the arguments which Dr. Blagden has advanced in favour of the hypothesis of electricity being the origin of meteors, are of considerable weight, yet the circumstances which have since occurred respecting the falling

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of stones from the sky, effectually remove one of his objections to the reception of professor Clap's hypothesis; namely, that of the meteors not "falling to the earth in consequence of various accidents," and at the same time they rise up against the electrical hypothesis; unless indeed another be attached to it, that electricity condenses and fuses the earthy and metallic exhalations in the atmosphere, which are thus precipitated to the earth's surface in greater or less portions. The other great objection to Clap's hypothesis, that of the velocity of fire-balls being greater than is consistent with a body revolving round the earth, however, remains in full force, except it can be shewn that the velocity of meteors has been much overrated. From the law of gravitation it is demonstrable, that the velocity of a body revolving round the earth cannot, even when in perigee, and near the surface of the earth, be less than five, nor more than seven miles *per second*. Hence, then, if the velocity of a meteor exceed seven miles *per second*, it cannot be a body revolving in an orbit round the earth. It does not appear, however, to be satisfactorily ascertained that the velocity of fire-balls exceeds seven miles *per second*. It is not perhaps going beyond probability to say, that no observer saw the great meteor of Aug. 18th, 1783, for more than an extent of 200 miles; as a proof, it may be remarked that the hurrying of the meteor, said to have taken place over Lincolnshire, was not observed at Kendal, though the distance from the nearest point, or that of greatest apparent altitude, was not more than 100 miles. Now if the meteor took 30 seconds to move 200 miles, it gives $6\frac{2}{3}$ miles *per second*; which is within the required limits. And, farther, let those who saw the meteor pass nearly through the zenith, endeavour to estimate the time it seemed to take in passing through an arc of 10° , or let the like observation be made upon a shooting star. Perhaps few, if any, will be found to insist upon the time being so little as one second; at least the writer of this article is not inclined to adopt the affirmative from his own observation. But 10 in one second would correspond only to eight miles of velocity, at the height of 50 miles above the earth's surface. It may therefore perhaps be still deemed problematical, whether the velocity of either the larger or smaller meteors ever exceeds seven miles *per second*; as also whether it ever falls short of five miles *per second*.

Upon the whole, the hypothesis of fire-balls being something of the nature of comets, that is, bodies revolving around the earth in excentric orbits, appears in the present state of the science to be as probable as any other. The light and heat acquired in passing through the perigee might be variously accounted for; but it would be premature to enter into a disquisition on this head, as long as such doubts remain respecting the real velocity of this sort of meteors. See BALLS of Fire and FALLING Stones

Ignis fatuus is the name of a luminous meteor, said to be seen occasionally in the night, hovering over moist ground, and about church-yards. Though it is stated by writers to be a common meteor, we find few authentic accounts of its nature and appearance; and some accounts are evidently mixed with superstitious notions respecting the origin of the meteor, and particularly with regard to its effects in misleading travellers. See *IGNIS fatuus* for more on this head.

One of the most splendid and most surprising of the luminous meteors is the *aurora borealis*, or *northern lights*. An account of this meteor may be seen under the article *AURORA Borealis*; but as some of the latest, and perhaps the most accurate observations on these striking phenomena, have been omitted in that account, it will be proper to introduce them here. The observations are those of Mr. Dalton, published

in his *Meteorological Essays*, 1793. This diligent observer resided in the north of England (at Kendal), during a period when these phenomena were very frequent; namely from 1786 to 1793. The *aurora borealis* has seldom appeared since that period; and it should seem, from the history of this meteor, that it is one in some way subject to periodical apparition.

Mr. Dalton has given the times and appearances of the *aurora borealis*, some of them described minutely, with accompanying observations on the variation of the magnetic needle. It seems the number of the phenomena seen at Kendal and Keswick, was as under:

	Number of <i>Aurora Borealis</i> .
1786	16
1787	27
1783	53
1789	45
1790	36
1791	37
1792	23

From such a number of observations, and from those previously made by others, to be found in various philosophical works, the author was enabled to generalize the phenomena of the *aurora borealis*. He observes, "the appearances of the *aurora* come under four different descriptions. First, a *horizontal light*, like the morning *aurora*, or break of day. Secondly, fine, slender luminous beams, well defined, and of dense light; these continue $\frac{1}{4}$, $\frac{1}{2}$, or 1 whole minute, sometimes at rest apparently, but oftener with a quick lateral motion. Thirdly, *flashes* pointing upward, or in the same direction as the beams, which they always succeed; these are only momentary, and have no lateral motion, but they are generally repeated many times in a minute; they appear much broader, more diffuse, and of a weaker light than the beams; they grow gradually fainter, till they disappear. These sometimes continue for hours, flashing at intervals. Fourthly, *arches*, nearly in the form of rainbows; these, when complete, go quite across the heavens, from one point of the horizon to the opposite point.

When an *aurora* takes place, those appearances seem to succeed each other in the following order: First, the faint rainbow-like arches; secondly, the beams; and, thirdly, the flashes; as for the northern horizontal light, it will appear in the sequel to consist of an abundance of *flashes* or *beams* blended together, owing to the situation of the observer relative to them. These distinctions, and the terms appropriated for them, must be kept in view, in attending to the following phenomena.

Phenom. 1.—The beams of the *aurora borealis* appear, at all places alike, to be arches of great circles of the sphere, with the eye in the centre, and these arches, if prolonged upwards, would all meet in one point.

Phenom. 2.—The rainbow-like arches all cross the magnetic meridian at right angles: when two or more appear at once, they are concentric, and tend to the magnetic east and west: also, the broad arch of the *horizontal light* tends to the magnetic east and west, and is bisected by the magnetic meridian; and when the *aurora* extends over any part of the hemisphere, whether great or small, the line separating the illuminated part of the hemisphere from the clear part, is half the circumference of a great circle, crossing the magnetic meridian at right angles, and terminating in the magnetic east and west; moreover, the beams apparently perpendicular to the horizon, are only those on the magnetic meridian.

Phenom. 3.—That point in the heavens to which the beams of the *aurora* appear to converge at any place, is the same as

that to which the south pole of the *dipping-needle* points at that place.

Phenom. 4.—The beams appear to rise above each other in succession, so that of any two beams, that which has the higher base has the higher summit also, or its summit nearer the point of concurrence; the angle subtended by the length of each beam is not the same, it being greatest about half way from the horizon to the zenith, and less above and below; also the beams to the south subtend less angles than those to the north, having the same altitude. The greatest angle to the north seems to be about 25° or 30° ; and that to the south 15° or 20° .

Phenom. 5.—Every beam appears broadest at, or near, the base or bottom, and to grow narrower as it ascends, in such sort that the continuation of its bounding lines would meet in the common centre to which the beams tend; yet the summit of the beam is not flat, but pointed; the highest beams seem about 3° broad, and the lowest 1° .

In order to derive the true situation and position of the several objects presented in these phenomena, it was necessary to have recourse to the principles of geometry or perspective. Mr. Dalton premises five propositions. The first is to shew that any line in a plane passing through the eye, appears in the heavens to be an arch of a great circle. The other four propositions relate to the perspective appearance of one or more cylinders, supposed to be arranged upon a horizontal plane at any given elevation above the earth's surface, the cylinders being parallel to each other, and making a given angle with the horizontal plane. The propositions are illustrated by suitable diagrams, and demonstrated in the usual way. By a comparison of the data of these propositions with the above phenomena, the author makes certain inferences respecting the aurora borealis, and draws such conclusions as seem to be warranted by the established methods of reasoning in natural philosophy. These are,

1. The luminous beams of the aurora borealis are cylindrical, and parallel to each other, at least over a moderate extent of country.

2. The cylindrical beams of the aurora borealis are all magnetic, and parallel to the dipping-needle at the places over which they appear.

3. The height of the rainbow-like arches of the aurora, above the earth's surface, is about 150 English miles.

4. The beams of the aurora are similar, and equal in their real dimensions to one another.

5. The distance of the beams of the aurora from the earth's surface is equal to the length of the beams nearly. This distance is subsequently estimated at 75 miles.

6. That appearance which we have called the *horizontal light*, and which is always situate near the horizon, is nothing but the blended lights of a group of beams, or flashes, which makes the appearance of a large luminous zone.

The author next proceeds to develop, at some length, an hypothesis, by which he proposes to explain these wonderful phenomena. It is ingenious, but cannot be considered as satisfactory. Future investigation may derive from it some useful hints. The following is a brief sketch of it.

Mr. Dalton conceives an extremely subtle elastic fluid of a *ferruginous* nature, or at least such as is capable of being acted upon magnetically, to exist in the higher regions of the atmosphere; perhaps without the verge of the common atmosphere. That this elastic fluid is collected into parallel cylindrical beams, and horizontal rings, over the regions of the earth near the magnetic pole, by virtue of the earth's magnetism; and that the beams, &c. are preserved in their due form and position, and distinct from each other by their mutual magnetic action. This fluid is supposed to be an

imperfect conductor of electricity. When the electricity of the upper regions of the atmosphere is disturbed, it is supposed the electric fluid runs along these beams and rings from one part of the atmosphere to another, to restore the equilibrium. The reason why the diffuse flashes succeed the more intense light of the beams, is because the electricity disperses the elementary particles of the beams in some degree, which collect again after the electric circulation ceases. Hence too, he conceives, is the reason of the fluctuations of the magnetical needle below, while the magnetism of the upper regions of the atmosphere is thus affected. The general observations on the disturbance of the needle are stated as under.

1. When the aurora appears to rise only about 5° , 10° , or 15° above the horizon, the disturbance of the needle is very little, and often insensible.

2. When it rises up to the zenith, and passes it there, it never fails to be a considerable disturbance.

3. This disturbance consists in an irregular oscillation of the horizontal needle, sometimes to the eastward, and then to the westward of the mean daily position, in such sort that the greatest excursions on each side are nearly equal, and amount to about half a degree each in this place.

4. When the aurora ceases, or soon after, the needle returns to its former station.

One section on the aurora borealis is destined to the enquiry, How far the moon has an effect in producing this meteor, or whether the phenomenon is influenced by the aerial tides? It appeared that the average number of auroræ observed during the period of spring tides, was to the number observed during the period of neap tides, as 4 to 3. Also, it appeared that spring and autumn (seasons in which the tides are usually highest) are most favourable for the production of this meteor, as may be seen by the following table.

	Number of Auroræ.		Number of Auroræ.
January	18	July	2
February	18	August	21
March	26	September	23
April	32	October	36
May	21	November	38
June	5	December	9

Some of the most splendid appearances of the aurora borealis were observed in a troubled and rather tempestuous state of the atmosphere; but it did not appear in general that this meteor affords any decisive prognostic of the weather. See AURORA BOREALIS, FALLING STONES, &c. Also, for other luminous meteors, see RAINBOW, HALO, PARHELIA, ZODIACAL LIGHT, &c.

METEORIC STONES. See FALLING STONES.

METEORISMUS, in *Medicine*, from *μετεωρος*, *sublimis*, has been applied by medical writers to that tumid state of the belly, arising from flatulence, which distends only the upper parts, as the pit of the stomach and the hypochondriac regions. See Sauvages Nosol. Method. clafs x. gen. 16, who has made four species of Meteorismus: also Castelli Lexic. Med. Art. *Meteoros*.

METEOROLOGICAL JOURNAL, is a table recording the daily state of the air, exhibited by the barometer, thermometer, hygrometer, anemometer, and other meteorological instruments. We have many journals of this kind kept at the house of the Royal Society, and by different observers in other places, in the Philosophical Transactions, the Memoirs of the Academy of Sciences, and similar publications.

METEOROLOGY.

METEOROLOGY is a science which treats of the weather, or of the various affections and phenomena of the atmosphere, as winds, clouds, rain, hail, snow, dew, thunder and lightning, and the fiery meteors. The universal importance of this science is acknowledged; and it may be said that for 150 years past, or since the invention of the barometer and the air-pump, almost every distinguished natural philosopher has contributed to its advancement, either by the discussion of hypotheses or by the observation of facts. The difficulty, however, of forming a correct theory of the phenomena of the atmosphere may easily be conceived, when we consider that it is requisite for a person to have a large collection of facts, and an extensive acquaintance with several collateral sciences; for instance, with mechanics, pneumatics, electricity, and chemistry.

The principal instruments of use in meteorology are, the barometer, by which the weight or pressure of the atmosphere over any place is known; the thermometer, which ascertains the temperature of the air; the hydrometer, to denote the moisture or dryness of the air; the pluviometer, or rain-gauge, to measure the depth of rain that falls; the evaporation-gauge, to shew the depth of water evaporated; the wind-dial, to point out the direction of the wind; the anemometer, to measure its force; and the electrometer, to ascertain the kind and intensity of electricity in the air. See these different instruments described under their appropriate heads.

In order to form a proper notion of the phenomena of the atmosphere, as exhibited at any one place, it will be necessary to obtain a correct notion of the atmosphere itself at large. It appears to be a collection or mixture of various elastic fluids in very different proportions, retained on the surface of the earth by their gravitation. The principal part of the weight of the atmosphere arises from the permanently elastic fluids, azotic gas, and oxygenous gas, the quantities of which are as 4 to 1 nearly: about one part in a thousand of the atmosphere is constituted of another permanently elastic fluid, carbonic acid. The rest of the atmosphere consists of aqueous vapour or steam, an elastic fluid subject to partial condensation by a diminution of temperature. The quantity of this elastic fluid is variable at different places and in different seasons; it may perhaps constitute $\frac{1}{70}$ th of the weight of the whole atmosphere, considered as a general average for the earth; but in some places within the torrid zone it may amount to $\frac{1}{30}$ th of the weight of the incumbent atmosphere; and in the polar regions may sometimes be less than $\frac{1}{1000}$ th part of the atmosphere. It is this portion of the atmosphere which more immediately occasions some of the principal phenomena in meteorology, particularly clouds, rain, hail, snow, dew, and thunder and lightning; it has considerable influence on the temperature of the atmosphere; but it has little effect in the production of winds, or on the variation of the barometer.

The atmosphere decreases in density as we ascend in a geometrical progression to equal ascents. As far as experience warrants the conclusion, the several kinds of gas decrease in density in the same ratio: thus, if at three miles in height, the weight of the atmosphere is one-half what it is at the earth's surface; then will the proportions of the several elastic fluids found in a given volume of air, at that place, be the same as what they are in a like volume of air taken at the surface of the earth; all the kinds being diminished one-half nearly in weight and density. This conclusion is not, perhaps, strictly true for every height, nor for any two heights; but experiments have not been made with sufficient accuracy to ascertain the deviation from this law. At six miles elevation the barometer would stand at

$\frac{1}{4}$ the height at the surface, or at $7\frac{1}{2}$ inches; at 9 miles of elevation, $3\frac{1}{4}$ inches; at 12 miles, 1 $\frac{1}{2}$ inch; and at 15 miles, nearly 1 inch. Hence it seems that the greatest part of the atmosphere is at all times within 15 or 20 miles of the surface of the earth; and it is probable that the ordinary phenomena of winds, clouds, rain, &c. are chiefly confined within much narrower limits.

Origin of Winds.—If the atmosphere should be perfectly calm at any one time all over the surface of the earth, it is evident that there must be an equilibrium of pressure, or the weight of air incumbent over every place must be the same, and the real velocity of the air over any place arising from the earth's rotation around its axis, would be the very same as that of the place itself; namely, at the equator the velocity would be about 1000 miles per hour, from W. to E.; and in the lat. of London the velocity would be 620 miles from W. to E.; and at the poles of the earth, the air would have no velocity. If an equilibrium of this kind were once obtained, there appears to be no mechanical reason why it should be disturbed, arising out of the circumstance of the earth's rotation. But if any cause should arise which disposes the air to move from any part of the earth in a northerly or southerly direction, it is also evident that the rotation of the earth would conspire with this cause to modify the direction, and to accelerate the velocity of the current of air so produced. For instance, suppose a body of air in the lat. of London was to receive an impulse or series of impulses, such as to compel it to move 16° southward in a day, with an uniform velocity; this current of air gradually passing through other air of greater velocity eastward, will in part be carried along with the current, and when it arrives at the 10th parallel it will find air disposed to move from W. to E. with a velocity of 750 miles per hour, being the velocity of the place; whereas its own velocity in that direction was only 620 miles. Now if the moving current of air have not acquired the additional velocity of 130 miles per hour from W. to E., it must appear at the place to have a motion from E. to W. with a velocity equal to the difference or deficiency; suppose it has only acquired 105 miles additional velocity eastward, then it will appear to move at the rate of 25 miles per hour westward; and as it moves also 25 miles southward each hour, it is manifest its direction will be truly that of a N.E. wind, and its velocity 35 miles per hour. If the air is impelled northward, instead of southward, then *vice versa*, a S.W. wind is produced. It appears, then, that as soon as any cause operates to impel a portion of the atmosphere either north or south, that instant the rotation of the earth on its axis begins to manifest an effect, which is to accelerate the apparent velocity of the current, and to divert its direction. We are then directed to look for some natural cause or stimulus which may, either occasionally or constantly, operate in impelling the atmosphere in a meridional direction. This cause is found in the unequal temperature of the atmosphere in the different zones of the earth. The torrid zone is always the warmest region of the earth. The temperate zones are colder; but alternately approximate to the temperature of the torrid zone. The frigid zones are colder still, but they also alternately make some approximation to the temperature of the torrid zone. Now it is well known that air is expanded by heat, and hence becomes specifically lighter; the air over the torrid zone being then specifically lighter than the air in the temperate zones, it will have a tendency to ascend, whilst the air in the two temperate zones will press forward to supply the vacancy, and the air in the frigid zones will follow after upon the same principle. Hence it appears that there must always be a draught of air from the polar towards the equatorial regions, greater

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greater or less according to the existing difference of temperature. As, however, an accumulation of air in the torrid zone would thus ensue, and a deficiency in the other zones, means must be found to return the excess of air over the torrid zone into the northern and southern regions. This is effected, without doubt, by the upper regions of the atmosphere in the torrid zone meeting with a less lateral pressure than is adequate to support them. The air rises up, and overflows in some degree, so that currents northward and southward are established, in opposite directions to the two former currents, and superior to them. The two under currents, as has been shewn, will be N.E. and S.E. winds; the two upper currents, by a like method of reasoning, will be S.W. and N.W. winds. The two under currents, or the N.E. and S.E., meeting each other in the torrid zone, their velocities N. and S. are destroyed by their opposition, but their velocity from E. to W. continues, and occasions the regular or trade-winds. But it is not our design in this place to do more than point out the great active principles, which are constantly at work to produce a motion and circulation of the atmosphere; a more particular description and detail will be given under the article WINDS. The principle, however, cannot but be allowed by those who duly consider the effect of the earth's rotation, and the currents of air we ordinarily observe in any room containing a fire.

Origin and Nature of Clouds.—Clouds are constituted of an infinite number of very minute drops of water; they are formed by the condensation of steam or vapour by cold. In order to understand their origin, we must take a view of the atmosphere of steam already mentioned, and consider its rise and properties. Steam, as every one knows, is an elastic fluid arising from the union of water and heat; and it is again condensible into water by cold, so as to lose its elasticity. Steam is formed almost instantaneously from water inclosed in a vacuum; the maximum effect is at once produced, and there is an end of the evaporation, unless the temperature is increased. The same effect is produced when the water is inclosed in the same volume of perfectly dried common air, or any other kind of air perfectly dried, not acting chemically on water. The same quantity of water, in this case as in the former, is converted into vapour, and the same elastic force of steam is produced for the maximum effect; but there is this difference in the two cases, the latter requires a sensible *time*, in order that the maximum effect may be produced. This demonstrates that the presence of air retards evaporation, and that in all probability is, by reason of its pressure on the surface of the water. From all these observations it might be expected that evaporation would go on, and the quantity of steam in the air increase till the maximum effect was produced over all the earth, and then there would be a total cessation. But we find that evaporation is unceasingly going on in almost every place, and even at the very place where rain is descending. This curious fact would appear at first view to be of difficult explanation; but the difficulty is not insurmountable, as will presently be shewn.

It appears that the quantity of steam that can be contained in a vessel, either with or without air, increases nearly in geometrical progression to equal intervals of temperature. Mr. Dalton contends that the increase is *accurately* in geometrical progression, and that the intervals of temperature are not duly measured by the common thermometer; however this may be, there can be no doubt that the former increases more rapidly than the latter. It has been found, that if the maximum of steam in air of 32° be denoted by 2, that of air of 52° will be denoted

by 4, and that of air of 72° by 8. (See Dalton's Chemistry, p. 14.) Hence it is obvious, that if equal portions of air of 32° and 72° , both saturated with vapour, were mixed together, the mean temperature would be 52° , and the quantity of vapour present in the mixture would be 10; whereas, the greatest quantity of vapour that the air of that temperature could contain, is only 8, according to the above statement; whence two parts must be condensed, and would first appear in the shape of a cloud, and be ultimately deposited. Here, then, we perceive the origin of clouds and rain. It has been shewn that an unceasing circulation of air between the equatorial and polar regions takes place; and as both currents of air must be supposed to be near the point of saturation with vapour, there must frequently be a cloud formed by their mixture. The current from the equator is warm and full of vapour, compared with the air of like altitude in the northern and southern regions; and *vice versa* with regard to the air from the north and south towards the equator. This last air is cold, but nearly saturated with vapour for its temperature; and hence will precipitate vapour from warm air. Were the currents of air to and from the equator quite saturated with vapour at their departure, there must be perpetual cloudiness to accompany their progress; but the circulation of air is so quick, and the saturation with vapour is slowly effected by reason of the pressure of the atmosphere, that it rarely happens for the currents to be saturated at their commencement. It is easy to see, then, that this circumstance, with others equally obvious, may modify the effects so far, as that the atmosphere may be either clear or cloudy over any place whilst the general currents are making their ordinary progress. It is owing to the same circumstance (the slowness with which steam circulates itself through the air) that two currents of air may meet in the higher regions of the atmosphere, and a precipitation of vapour may ensue, when the inferior strata of air are not saturated with vapour. This, indeed, is generally the case in showery weather, but never in long continued rain. The more particular details of this theory of rain will be better deferred till the article *Rain* is composed. See RAIN, also CLOUDS, EVAPORATION, &c.

If any doubt should remain as to the correctness of the above views in regard to the formation of clouds and rain, it may be completely removed, if we will take the trouble to examine the phenomena of a drying stove. We may there see the process above described completely copied in miniature. The moment we open the door to enter the stove, the cold air rushes in, and a prodigious cloud is instantly formed, so as to render surrounding objects invisible: soon after the door is shut, the cloud disappears, and the internal air resumes its usual transparency. Here, then, is an instance of a current of cold air rushing into warm, both of them being below the point of saturation with vapour, and yet a great precipitation takes place. Again, if we notice the air which has ascended the air-flues of the stove and is mixing with the atmosphere, we find a copious stream or cloud of condensed vapour spreading itself all around. This is formed by the current of warm air rushing into the cold atmosphere, though both of them are usually below the point of saturation with vapour.

Height of the Clouds.—We shall subjoin the results of a series of observations on the height of the clouds: these are the more valuable, as very few meteorologists have an opportunity of making similar observations. They were made by Mr. Crosswaite, of Keswick, in Cumberland. In mountainous countries the clouds frequently surround the hills, like a girdle, and exhibit a smooth horizontal surface; if

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the height of the hill at the point of intersection be known by previous observation, then the mountain may be made into a scale to measure the altitude of the clouds. The mountain Skiddaw was fixed upon for that purpose, and Mr. Crotthwaite determined its height above Derwent lake to be 1050 yards. This altitude is probably too great, but the error will have no material effect in the present consideration.

“The result of five years’ observations is contained in the

following table. In order to determine what effect the seasons of the year have upon the clouds in this respect, we have kept the observations in the several months distinct. It is to be noted, that the column containing the number of observations when the clouds were above Skiddaw, includes those observations when there were no clouds visible; but Mr. Crotthwaite has noted this last circumstance also in the journal, and it appears that about one observation in thirty, of those in that column, should be deducted on that account.

	Clouds from 0 to 100 Yards high.	From 100 to 200 Yards high.	From 200 to 300 Yards high.	From 300 to 400 Yards high.	From 400 to 500 Yards high.	From 500 to 600 Yards high.	From 600 to 700 Yards high.	From 700 to 800 Yards high.	From 800 to 900 Yards high.	From 900 to 1000 Yards high.	From 1000 to 1050 Yards high.	Above 1050 Yards high.	Number of Observations.
January -	0	9	12	28	53	39	37	32	30	39	36	116	431
February -	5	10	5	15	41	45	45	27	43	38	29	94	397
March -	2	1	6	11	22	40	32	36	24	32	44	154	434
April -	0	4	5	18	24	34	37	26	23	38	35	206	450
May -	0	1	4	8	13	31	22	25	30	34	27	270	465
June -	0	2	2	6	24	24	29	21	34	41	34	233	450
July -	0	2	2	18	35	36	35	25	35	48	38	191	465
August -	0	4	5	13	27	39	35	26	25	41	30	215	464
September	0	1	7	13	38	38	32	30	27	51	27	186	450
October -	2	0	5	13	26	49	31	31	46	61	37	164	465
November	0	0	3	13	30	58	42	38	46	45	47	128	450
December	1	8	6	23	41	53	39	50	47	46	35	111	460
Total -	10	42	62	179	374	486	416	367	410	518	419	2098	5381

“It may be proper to observe, that the supposition of the clouds rising or falling with the barometer, or as the density of the air increases or diminishes, is not at all countenanced by these observations. Also, that in very heavy and continued rains the clouds are mostly below the summit of the mountain; but it frequently rains when they are entirely above it.” Dalton’s Meteorology, p. 40.

By comparing the parts of the above table, it is manifest that clouds are at an average higher in summer than in winter; and by analogy, we may conclude that clouds are higher in the torrid zone than in the temperate zones, and higher in these last than in the frigid zones. From the above observations it would seem, that the large, dense, opaque clouds seldom are found more than one mile elevated in this country; but the thickness of the cloudy stratum is unknown, and may perhaps be several hundred yards. Different strata of clouds are sometimes observed one above another, in summer especially. Small white streaks of cloud are sometimes seen at the elevation of three, four, five miles, or more. In these high regions, any condensation that can take place is probably insufficient to produce a cloud of great density or opacity.

Suspension of Clouds.—It appears to many people wonderful how large and dense clouds, consisting of drops of water, should be so long suspended in the air, as some of them seem to be, without materially descending; especially as water is 800 times the weight of air. This is to be explained on two principles: the one is, that bodies in a state of extreme division are much more resisted in their motion through the air, or any other fluid, than when in large portions. Gravity, or the force of descent, remains the same

whether the body is divided or not; but the surface increases with the division of the body, and the resistance increases with the surface. Hence it is that the extremely small drops, constituting clouds, fall very slowly, till they begin to coalesce or increase in size. The other principle is, that small drops falling into a stratum of air not saturated with vapour, are frequently resolved again into steam; thus, that part of the cloud which actually descends disappears; and it not unfrequently happens that the whole cloud vanishes in this way, being again converted into vapour, and blended with the general mass of the atmosphere.

Rain, Snow, Hail, and Dew.—Whenever two currents of air of different temperatures meet and intermix, each of which is previously near the point of saturation with vapour, or whenever a body of atmospheric air is suddenly cooled (as by the rarefaction occasioned by the stroke of an air-pump, or by opening the cock of a condensing engine), a cloud is formed, and a precipitation often ensues. The precipitation is in the form of rain if the temperature be above 32° Fahr., but in the form of snow if the temperature be below the said degree. Rain or snow is ordinarily observed in all latitudes; but in the torrid zone the latter is confined to the summits of the highest mountains. Hail is an extraordinary form in which the vapour is precipitated; it seems to arise from an inversion of the strata of the atmosphere, by which a cold stratum is placed beneath a warmer one, contrary to the general disposition of the atmosphere. Rain is formed in the upper stratum, and this falling through the under stratum is cooled and frozen, receiving at the same time a considerable accession from the condensation on the surfaces of the frozen drops. Hail-showers occur in all

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seasons of the year, but more rarely in the summer months; they, however, sometimes accompany thunder in those months, and are peculiarly destructive and formidable. Hail seems to be confined principally to the temperate zones: it is probable that in this quarter of the globe hail is seldom observed, except between the parallels of 40° and 60° of latitude. It is more frequent in mountainous places than on plains; in the former hail-showers usually occur on five or six days of the year at an average.

Dew is formed when, instead of cold air mixing with warm, a cold solid or liquid body is presented to (comparatively) warm air. There exists a determinable temperature at all times, which is just capable of supporting the vapour of the atmosphere in an elastic state. (See *HYGROMETRY, on the Dew-point.*) If the temperature of the cold body be below this, then the vapour of the atmosphere is gradually condensed into water on its surface: this is a well-known phenomenon, and presented on various occasions. The dew on the grass and the hoar on walls after the breaking of a frost, are two of the more striking appearances of this kind.

Temperature of the Atmosphere.—This important subject has already been treated upon at large under the heads, *ATMOSPHERE, Temperature of the;* and *HEAT, in Geography,* to which we must therefore refer. There is, however, one remarkable character of the atmosphere, namely, that of the uniform decrease of temperature in ascending, which has never been satisfactorily explained. An ingenious essay on this subject has lately been published, from which we shall here give an extract.

“It is a remarkable fact, and has never, I believe, been satisfactorily accounted for, that the atmosphere in all places and seasons is found to decrease in temperature in proportion as we ascend, and nearly in an arithmetical progression. Sometimes the fact may have been otherwise, namely, that the air was colder at the surface of the earth than above, particularly at the breaking of a frost I have observed it so; but this is evidently the effect of great and extraordinary commotion in the atmosphere, and is at most of a very short duration. What then is the occasion of this diminution of temperature in ascending? Before this question can be solved, it may be proper to consider the defects of the common solution. Air, it is said, is not heated by the direct rays of the sun, which pass through it as a transparent medium, without producing any calorific effect, till they arrive at the surface of the earth. The earth being heated, communicates a portion to the contiguous atmosphere, whilst the superior strata, in proportion as they are more remote, receive less heat, forming a gradation of temperature, similar to what takes place along a bar of iron when one of its ends is heated.

“The first part of the above solution is probably correct: air, it should seem, is singular in regard to heat; it neither receives nor discharges it in a radiant state; if so, the propagation of heat through air must be effected by its conducting power, the same as in water. Now we know that heat applied to the under surface of a column of water is propagated upwards with great celerity, by the actual ascent of the heated particles: it is equally certain, too, that heated air ascends. From these observations it should follow, that the causes assigned above for the gradual change of temperature in a perpendicular column of the atmosphere, would apply directly to a state of temperature the very reverse of the fact; namely, to one in which the higher the ascent, or the more remote from the earth, the higher should be the temperature.

“Whether this reasoning be correct or not, it must, I think, be universally allowed, that the fact has not hitherto

received a satisfactory explanation. I conceive it to be one involving a new principle of heat; by which I mean a principle that no other phenomenon of nature presents us with, and which is not at present recognised as such. I shall endeavour in what follows to make out this position.

“The principle is this:—*The natural equilibrium of heat in an atmosphere, is when each atom of air in the same perpendicular column is possessed of the same quantity of heat; and, consequently, the natural equilibrium of heat in an atmosphere is when the temperature gradually diminishes in ascending.*

“That this is a just consequence cannot be denied, when we consider that air increases in its capacity for heat by rarefaction; when the quantity of heat is given or limited, therefore, the temperature must be regulated by the density.

“It is an established principle, that any body on the surface of the earth unequally heated is observed to tend constantly towards an equality of temperature: the new principle announced above, seems to suggest an exception to this law. But if it be examined, it can scarcely appear in that light. *Equality of heat and equality of temperature,* when applied to the same body in the same state, are found to uniformly to be associated together, that we scarcely think of making any distinction between the two expressions. No one would object to the commonly observed law being expressed in these terms: *When any body is unequally heated, the equilibrium is found to be restored when each particle of the body becomes in possession of the same quantity of heat.* Now the law thus expressed is what I apprehend to be the true general law, which applies to the atmosphere as well as to other bodies. It is an *equality of heat,* and not an *equality of temperature,* that nature tends to restore.

“The atmosphere, indeed, presents a striking peculiarity to us in regard to heat: we see in a perpendicular column of air, a body without any change of form, slowly and gradually changing its capacity for heat from a less to a greater; but all other bodies retain a uniform capacity throughout their substance.

“If it be asked why an equilibrium of heat should turn upon the equality in *quantity* rather than in *temperature*? I answer, that I do not know; but I rest the proof of it upon the fact of the inequality of temperature observed in ascending into the atmosphere. If the natural tendency of the atmosphere was to an equality of temperature, there does not appear to me any reason why the superior regions of the air should not be at least as warm as the inferior.

“The arguments already advanced on behalf of the principle we are endeavouring to establish, are powerfully corroborated by the following facts:—By the observations of Bouguer, Saussure, and Gay Lussac, we find that the temperature of the air at an elevation where its weight is $\frac{1}{2}$, that at the surface is about 50° Fahrenheit less than that at the surface; and from my experiments (*Manch. Memoirs, vol. v. p. 525.*) it appears that air being suddenly rarified from 2 to 1, produces 50° of cold. Whence we may infer, that a measure of air at the earth's surface being taken up to the height above-mentioned, preserving its original temperature, and suffered to expand, would become two measures, and be reduced to the same temperature as the surrounding air; or *vice versa*, if two measures of air at the proposed height were condensed into one measure, their temperature would be raised 50° , and they would become the same in density and temperature, as the like volume of air at the earth's surface. In like manner we may infer, that if a column of air from the earth's surface to the summit of the atmosphere were condensed, and brought into a horizontal position on the earth's surface, it would become

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of the same density and temperature as the air around it, without receiving or parting with any heat whatever.

"Another important argument in favour of the theory here proposed, may be derived from the contemplation of an atmosphere of vapour. Suppose the present aerial atmosphere were to be annihilated, and one of steam or aqueous vapour were substituted in the place; and suppose, further, that the temperature of this atmosphere at the earth's surface were every where 212° , and its weight equal to thirty inches of mercury. Now at the elevation of about six miles the weight would be fifteen inches or one-half of that below, at twelve miles it would be 7.5 inches, or one quarter that at the surface, &c. and the temperature would probably diminish 25° degrees at each of these intervals. It could not diminish more; for we have seen (p. 14.) that a diminution of temperature of 25° reduces the force of vapour one-half; if, therefore, a greater reduction of temperature were to take place, the weight of the incumbent atmosphere would condense a portion of the vapour into water, and the general equilibrium would thus be disturbed perpetually from condensations in the upper regions. But if we suppose, on the other hand, that the diminution of temperature in each of these intervals is less than 25° , then the upper regions would admit of more vapour without condensation; but it must take place at the surface, because vapour at 212° cannot sustain more than the weight of thirty inches of mercury." Dalton's New System of Chemical Philosophy, p. 123.

Thunder and Lightning.—Of all the atmospherical phenomena there are none more awfully sublime than those of thunder and lightning. Respecting the nature and cause of these it would be useless to cite the opinions of ancient philosophers, as all our real knowledge on these subjects is derived from modern discoveries, and particularly those in electricity. Dr. Franklin ascertained the identity of lightning and electricity; since then the attention of philosophers has been directed to the inquiries, how the electric fluid or energy circulates from the earth to the air and back again to the earth; by what means it is raised into the atmosphere, how it becomes redundant, and how it is returned to the earth again. The aqueous vapour, or steam of the atmosphere, appears to be the vehicle. The dry and permanent elastic fluids have probably no more to do than as non-conductors of electricity to obstruct its passage through the atmosphere. When water is evaporated it takes along with it a greater quantity of electricity, as well as heat,

than it had before; that is, the capacity of vapour for electricity is greater than that of water. This fact has been observed by most of those who have, of late years, carefully attended to electrical phenomena. (See *Electricity of the Atmosphere*.) Of course when the steam is condensed into water, there must be a redundancy of electricity as well as of heat; and if the air be a non-conductor (as it undoubtedly is when dry), the drops of water, or the cloud formed, must be electrified positively. This is ascertained to be the fact; indeed it may be seen in the article above referred to, that the electricity of the atmosphere is almost universally positive. If, during a thunder-storm, and on some few other occasions, the atmosphere exhibit signs of negative electricity, it can scarcely be doubted that this is occasioned by the action of some superior cloud, which being positively electrified, makes the other, or the circumambient air, negative by induction, agreeably to the well-known law of electricity. The reason why the atmosphere cannot be negatively electrified is, that in the ordinary course of nature *no evaporation of water insulated by the atmosphere can ever take place*; the evaporation being always originally from the earth's surface. We have observed, indeed, that clouds are sometimes re-dissolved in the air; but then these clouds being insulated must have their excess of electricity about them, and consequently will not rob the atmosphere at large of any electricity that naturally belongs to it.

Conformably to these observations then, we may lay it down as an established maxim, that *the electricity of every cloud at its formation is positive*. It will remain then to be explained how the phenomena of thunder and lightning are to be accounted for on this position. One most obvious question occurs; if the electricity of one cloud find it expedient to force its way to the earth by a violent discharge, why is it not universally the case, and why are not thunder and lightning as frequent as clouds and rain?

Before this question can be satisfactorily answered, we must make ourselves acquainted with the circumstances that usually accompany thunder and lightning. It will be generally allowed, that the frequency of thunder and lightning, in this part of the world at least, is in proportion to the quantity of aqueous vapour in the atmosphere, or, which nearly amounts to the same thing, to the temperature of the air. The following extract from Dalton's *Meteorology*, being the result of five years' observations, will support this assertion. See pages 29 and 46.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean temperature each month	37°	39°	39°	45°	51°	56°	57°	58°	53°	46°	41°	35°
Number of days when thunder was heard	1	0	0	3	7	5	12	7	4	2	0	1

In fact, thunder is very rare in winter, perhaps never known in frost, more frequent in spring and autumn; but it is in the months of May, June, July, August, and September, which are the warmest months in the year, that we usually expect, and have to record thunder-storms of any consequence or duration. Of these months, July, which is the middle of the series, is generally the warmest, and from the above statement appears pre-eminent for thunder-storms. It is further remarkable, that when thunder is observed in winter, it is *always during a low barometer, and an unusually warm vapoury state of the atmosphere*; also in summer, whenever the dew-point temperature arrives at a maximum for the season (that is, from 55° to 62° , or upwards), it is reduced for the most part by a thunder-storm and considerable rain. With regard to other climates, it is known that thunder is frequent and violent in low latitudes, and in all places where the extremes of heat and moisture are found;

but we do not often hear of its effects in high latitudes where neither heat nor moisture can be long prevalent. Whenever vapour is precipitated from the atmosphere by the causes we have already assigned, the quantity will be greater in proportion as the absolute quantity of aqueous vapour in the atmosphere is greater: this arises from the increase of vapour being in a geometrical progression to that of temperature in arithmetical progression. Rain, with the dew-point at 60° , will be twice as heavy, all other circumstances the same, as rain with the dew-point at 40° ; because there is twice as much steam in the air in the former case. It has already been observed, that the clouds are higher or more elevated above the surface of the earth in summer than in winter. From combining these observations we may, perhaps, obtain a satisfactory reason for thunder not accompanying every cloud and shower of rain. In winter the clouds are low, less dense, and consequently less

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electric, than in summer; their electricity silently and slowly steals away to the earth's surface. In summer the intensity of the electricity is double, in consequence of its quantity being as the vapour condensed, and it is more removed from the earth, or insulated by its superior altitude; hence its energy may be so far increased as to overcome the resistance of the air. Thus, if an imperfectly rounded ball be presented at a proper distance from the conductor of an electrical machine, it will slowly and silently draw off the electricity; but if the intensity of the electricity be increased sufficiently, nearly the whole will come away in an instant in the shape of a dense spark, with a snapping noise.

There is another circumstance which probably has considerable influence in giving a highly vapourized air its character for favouring thunder. It admits of several strata of clouds arranged one beneath another, which will operate like the series of plates in the Voltaic pile in increasing the intensity of their electric charge. This disposition cannot well occur in winter, as the higher air is too deficient in vapour to spare an adequate quantity for the purpose.

One very remarkable character of thunder has not been duly noticed by philosophers; that is, the long continuance of each single peal. It may, perhaps, be safely asserted, that the duration of a peal of thunder is at an average about twenty seconds; it is certainly longer in many instances. Now, as the flash of lightning is instantaneous, we have no rational method of explaining the continuance of the sound, but by supposing the discharge to extend for a great many miles; if the sound continue half a minute, the discharge cannot be less than through the space of seven miles, but may be twice as much, or more. How, then, is this great length of the discharge to be explained? In order to meet this question, we may remark, that clear air is a bad conductor of electricity, but that clouded air possesses a kind of middle quality, of being neither a good conductor, nor a good non-conductor. We may suppose that the same electric energy which forces a way through 100 yards of clear air, may be capable of forcing a way through 10,000 yards of densely-clouded air. Hence we may account for the long continuance of thunder, by supposing that the electricity of a superior cloudy stratum strikes an inferior stratum at the nearest point, and runs along it for a number of miles. The sound arrives at the ear from the nearest point of the course first, and afterwards successively from the more remote points, and thus occasions the continuance of the sound. This view of the subject is corroborated by the observation, that whenever a clap of thunder is noticed to be remarkably near, or to succeed the flash immediately, by one inhabitant of any large town, it is noticed in like manner by most of the other inhabitants, though situate some miles distant from each other.

Thunder may be heard to the distance of ten or fifteen miles, but seldom further; this is ascertained from a calculation of the velocity of sound during the interval between the flash and the report in a dark night. It is uncertain to what distance lightning may be seen; we sometimes see it in the night when no clouds are visible; in this case it must be at a great distance, perhaps one or two hundred miles, or more. In such cases the flashes are observed to be much more frequent than when the thunder is near; this seems to indicate that in the latter instance we do not perceive all the lightning of the storm.

Causes of the Variation of the Barometer.—One of the most difficult problems in meteorology is to assign the causes for the daily changes in the weight of the atmosphere. Various opinions have been held with regard to these causes, many of which are too futile to merit animadversion. This sub-

ject has already received an ample discussion under the head *BAROMETER, Cause of the Phenomena of*, so that we shall be brief on the present occasion. It may be proper, in the first place, to state the leading facts: namely, that the variation of the barometer is least in the torrid zone, and is greater, as we proceed thence northward or southward; that in the temperate and frigid zones, the variation is always greater in winter than in summer. We shall take for granted that the whole atmosphere of the earth continues the same in quantity, and that the variations of the barometer arise from unequal distribution of the atmosphere, and not from any generation or destruction of elastic fluids. We shall also take for granted that any changes in the aqueous vapour of the atmosphere are insufficient to explain the phenomena, because if the whole quantity of aqueous vapour in the atmosphere were withdrawn from any place on any occasion, it would not depress the barometer one quarter of what is frequently observed in high northern latitudes in winter.

Mr. Kirwan's idea that the atmosphere is higher over the equator than over the poles, owing to the difference of temperature in those two regions, and that the currents occasioned thereby are instrumental in producing the changes of the barometer, is certainly entitled to our consideration. On this principle Mr. Dalton has constructed a table to shew the relative heights of the barometer at given elevations over the equator, the north of England, and the north pole. (*Meteorology*, page 83.) "The mean heat at the earth's surface under the equator is supposed 84° ; the mean heat in these parts for the hottest month of summer at 60° , and for the coldest month of winter at 35° . The mean annual temperature at the north pole being supposed 31° , the mean temperature for the coldest month of winter at that place may perhaps be stated at 2."

Elevation of the Barometer above the Level of the Sea in English Miles.	Height of the mercurial Column of the Barometer in Inches.			
	Above the Equator.	Above the North of England.		Above the North Pole.
		In Summer.	In Winter.	In Winter.
0	30.00	30.00	30.00	30.00
2	20.55	20.10	19.58	18.81
4	13.61	12.96	12.24	11.19
6	8.66	7.98	7.26	6.24
8	5.25	4.65	4.03	3.19
10	3.00	2.52	2.05	1.45
12	1.58	1.24	.93	.56

From this table it should seem, that the weight of air in a vertical column of six miles over the equator is nearly equal to that of a column of five miles over the pole in winter: that is, the heights of the atmosphere at the equator and pole are as 6 to 5 nearly. But the relation between the equator and the north of England in this respect, in summer is as 16 to 15, and in winter as 8 to 7 nearly. Now when the variations in the altitudes are greatest (in winter), the energy or velocity of the great northern and southern currents of air is greatest, as has been shewn above on winds, and therefore the irregularities occasioned by the interference, &c. of these currents must then be also at their greatest. These irregularities are shewn by the barometer. If we were to suppose that, from some extraordinary incidents, the atmosphere over the north of Eng-

land in winter were raised to the same elevation as that over the equator, all other circumstances being the same, the barometer must rise nearly four inches; and it would sink four inches if the atmosphere were depressed as much below the mean. But this supposition is much too extravagant to be admitted, and indeed the facts do not call for any thing near it. The barometer rarely rises or falls more than one and a half inch from the mean in this country; and consequently a slight variation of the mean altitude of the atmosphere is all that is required, and such may well be admitted.

Besides this variation of the mean altitude of the atmosphere, Mr. Dalton thinks there is another cause that acts in combination with it to produce the extraordinary falls of the barometer in winter, (which are observed to go below the mean more than the rises go above it.) He supposes, that during a violent S.W. wind on the occasion of a thaw (at which time the minimum usually takes place), a temporary change in the law of temperature in ascending exists. That the temperature in ascending is then more nearly uniform than at other times; by which means the elasticity in the lateral directions will be equal to any force that may be opposed, whilst the weight of a vertical column will be less than otherwise. See Meteorology, page 109.

For further information on meteorology, see ANEMOMETER, ATMOSPHERE, BAROMETER, CLOUD, DEW, EVAPORATION, FOG, HAIL, HYGROMETRY, LIGHTNING, METEOR, RAIN, SNOW, THERMOMETER, THUNDER, WIND, &c.

METEOROMANCY, a species of divination by meteors principally by lightning and thunder: this method of divination passed from the Tuscans to the Romans, with whom, as Seneca informs us, it was held in high esteem.

METEOROS, *μετεωρος*, from *μετα*, and *αυρα*, to elevate, in *Medicine*, elevated, suspended, sublime, erect, tumid. Thus *μετεωρα αλγυρα*, are expounded by Galen, Com. ad. Aph. 7. lib. vi. sublime pains: those which are above the peritonæum, or affect the superficial and external parts of the body. These pains are opposed to such as are deeply seated, and called *τα μη μετεωρα*, not sublime, but deep, and seated within the peritonæum.

METEOROSCOPE, from *μετεωρος*, high, and *σκοπος*, of *σκοπεωμαι*, I pierce, observe, a name which the ancient mathematicians gave to such instruments as they used for observing and determining the distances, magnitudes, and places of the heavenly bodies; many of which they regarded as meteors.

The name, however, may much more properly be applied to meteorological instruments.

METEPEC, in *Geography*, a town in the province of Mexico.

METERISCH, a town of Moravia, in the circle of Iglau; 17 miles E. of Iglau.

METESSIB, an officer of the eastern nation, who has the care and oversight of all the public weights and measures, and sees that things are made justly according to them.

METEYARD, in *Rural Economy*, a term applied to a flax or beam of a certain length for taking measures.

METEZAU, CLEMENT, in *Biography*, a celebrated French architect, who flourished in the former part of the 17th century, was a native of Dreux, but settled at Paris, became architect to Lewis XIII., and acquired much fame by carrying into execution, with Tiriot, a Parisian mason, the plan suggested by cardinal Richelieu for reducing Rochelle, by means of an immense dyke, in imitation of what Cæsar had done at Durazzo, and Alexander the Great at Tyre.

This scheme was to run a solid wall across a gulf upwards of 740 fathoms, or more than three quarters of a mile broad, into which the sea rolled with great force, and when the wind was high, with an impetuosity which seemed to set at defiance the art of man. Those who had undertaken the business were not to be turned aside by any obstacles: they began, by throwing in huge rocks, to lay a kind of foundation; upon these were placed vast stones, cemented by the mud thrown up by the sea. These were supported by immense beams, driven into the bottom with incredible labour. It was raised so high, that the soldiers were not incommoded by the water, even at spring tides. The platform was nearly 30 feet wide, and 90 feet at the foundation. At each extremity there was a strong fort, in the middle there was an open passage of 150 paces, several vessels being sunk immediately before it, together with high stakes in a double row, and before these 35 vessels linked together, so as to form a kind of floating pallisade. This amazing dyke was completed in somewhat less than six months, and proved the principal means of occasioning the surrender of the city. So honourable were the exertions of M. Metzau in this business, that his portrait was circulated widely through France, to which were attached the following lines,

“ Dicitur Archimedes Terram potuisse movere:
Æquora qui potuit siltare, non minor est.”

METH, METI, or *Mott*, in *Geography*, a small island near the coast of Africa, at the entrance of Babelmandeb, with a town upon it. N. lat. 11° 15'. E. long. 48° 45'.

METHANA, a town of the Morea, near the coast of the gulf of Engia; 56 miles E.S.E. of Napoli di Romania.

METHEGLIN, a drink prepared of honey; one of the most pleasant and general drinks the northern parts of Europe afford; and much used among the ancient inhabitants.

The word is Welsh, *meddyglin*, in which it signifies the same. There are divers ways of making it; one of the best of which follows: put as much new honey, naturally running from the comb, into spring water, as that, when the honey is thoroughly dissolved, an egg will not sink to the bottom, but be just suspended in it; boil this liquor for an hour, or more, till such time as the egg swim above the liquor about the breadth of a groat; when very cool, next morning, it may be barrelled up; adding to each fifteen gallons an ounce of ginger, as much of mace and cloves, and half as much cinnamon, all grossly pounded: a spoonful of yeast may be also added at the bung-hole, to promote the fermentation. When it has done working, it may be closely stopped up; and, after it has stood a month, it should be drawn off into bottles. See MEAD.

METHO, in *Geography*, a small independent country of Africa, S.E. of Fittre.—Also, a town of the Morea; 34 miles E.S.E. of Napoli di Romania.

METHOD, METHODUS, from *μεθοδος*, in *Logic* and *Rhetoric*, the art or rule of disposing things in such a manner, as that they may be easily comprehended; either in order to discover the truth, of which we ourselves are ignorant; or to shew or demonstrate it to others when known, or to fix it in the memory. See DISPOSITION.

Gassendus distributes method, with regard to its object, into three kinds, or branches, *viz.* inventionis, *the method of invention*, or discovering a truth unknown.

Methodus judicii, the method of judging or determining of a truth, or position, proposed.

And

And *methodus demonstrationis*, or method of demonstration; that is, of exhibiting it to another.

Method is distributed by others into two general kinds, *viz.* *natural* and *arbitrary*. *Natural* method is that which observes the order of nature, and proceeds in such a manner, as that the knowledge of things which follow depends in a great measure on the things which go before. *Arbitrary* method leaves the order of nature, and accommodates itself to many purposes: as to treasure up things, and retain them in the memory; to harangue and persuade mankind to any practice in the religious or civil life; or to delight, amuse, or entertain the mind. This kind of method is chiefly pursued in poetry and oratory.

Natural method is again subdivided into two kinds; the one of *resolution*, which is that we generally use in our enquiry after truth. The other of *composition*, by which the truth, once found, is taught or imparted to others.

In the method of *resolution*, called also by geometers the *analytic* method, we proceed from some general known truths to others, which belong to some particular or singular thing.

In the *method of composition*, called also the *synthetic* method, we propose some certain general truths, from which we produce particular truths.

If, in the method of resolution, we lay down any axioms, it is not immediately in the beginning, and all together, but as they are found necessary in the disquisition: on the contrary, in the method of composition, they are proposed all together in the beginning, before there is any absolute need of them.

The two methods differ from each other, as the methods of searching out a genealogy, either by descending from the ancestors to their posterity, or by ascending from the posterity to the ancestors: both of them have this in common, that their progression is from a thing known to another unknown. Those things that are known in each are set in the front, or first place, that by them we may be able to arrive at those which are not known.

Dr. Watts, in his excellent Treatise on Logic, has comprised the general requisites of true method in the pursuit or communication of knowledge, under the following heads. It must be, 1. Safe or secure from error: in order to which great care should be used in laying the foundations of a discourse, or the scheme of our thoughts, on any subject; the primary and fundamental propositions should not only be evident and true, but made familiar to the mind by dwelling on them before we proceed farther; our ground should be made firm in every step; and we should draw up all our propositions and arguments with so much caution, and express our ideas with such a just limitation, as may preclude or anticipate any objections. 2. Plain and easy: for which purpose, we should begin always with those things that are best known and most obvious, and proceed by regular and easy steps to things that are more difficult; nor should we affect excessive haste in learning or teaching any science, nor hurry at once into the midst of it; nor again crowd too many thoughts and reasonings into one sentence or paragraph, beyond the apprehension or capacity of our readers or hearers; we should also avoid too many subdivisions; and acquire in early life a clear and easy way of expressing our conceptions. 3. Distinct: in order to which no needless heterogeneous matter should be introduced; every complicated theme or idea should be divided into its distinct single parts, as far as the nature of the subject, and our present design, require; we should call every idea, proposition, and argument, to its proper class, and keep each part of the subject in its own place; and in

the partition of our discourse into distinct heads, take heed that particulars do not interfere with the general, nor with each other. 4. Full, or without defect: and this is necessary in explaining a subject; in enumerating its parts or properties; in asserting or proving any truth; in illustrating or arguing a point of difficulty; in drawing up a narrative; and in solving any difficulty. 5. Short, or without superfluity: for this purpose, all needless repetitions, tedious prolixity, long parentheses, useless explications, proofs, and refutations, and all scholastic forms, should be carefully avoided. 6. Proper to the subject, the design, and the age and place in which we dwell. 7. Connected: in order to this, we should keep our main design always in view, and preserve an apparent tendency in all the parts of our discourse towards it; the mutual relation and dependence of the several branches of our discourse should be so just and evident, that every part may lead onward to the next; and we should acquaint ourselves with all the proper and decent forms of transition from one part of the discourse to another, and practise them as occasion offers.

The *synthetic* method is only practicable in things whose principles we perfectly know; as in geometry, which is wholly employed in the consideration of abstract modes, of which our mind has clear and adequate ideas. When the inquiry is into substances, as in physics, we cannot make use of the method of *composition*, because their kinds and intimate essences are unknown to us.

This method has not been by any so justly and accurately observed as by the mathematicians, whose principles are perfectly known: its laws, therefore, will be best drawn from their practice; for which, see COMPOSITION.

The supreme law of the philosophical method is, to premise that which is necessary towards the understanding or establishing what follows.

The mathematical and philosophical methods are the same, as may be seen by the practice of the geometers of antiquity, who constantly observe the law here mentioned.

Several authors, as Ramus, Messrs. de Port-Royal, &c. have accused Euclid of want of method. Had these gentlemen attended to the supreme law of all true method, they would have been more cautious in their censures.

METHOD, *Methodus*, is more particularly used, in *Mathematics*, for divers particular processes for solving problems. In this sense we say,

METHOD of *Exhaustions*. See EXHAUSTIONS.

METHOD of *Fluxions*. See FLUXIONS.

METHOD de *Maximis & Minimis*, &c. See MAXIMA, &c.

METHOD of *Tangents*. See TANGENTS.

METHOD *Differential*, &c. See DIFFERENTIAL.

METHOD *Exponential*. See EXPONENTIAL.

METHOD *Poristic*. See PORISTIC.

METHODIC SECT. See METHODISTS, and MEDICINE, *History of*.

METHODISTS, in *Ecclesiastical History*, is a denomination applied to different sects, both Papists and Protestants.

The *Papish* Methodists were those polemical doctors, of whom the most eminent arose in France towards the middle of the seventeenth century, in opposition to the Huguenots or Protestants. The Methodists, from their different manner of treating the controversy with their opponents, may be divided into two classes. The one may comprehend those doctors, whose method of disputing with the Protestants was disingenuous and unreasonable, and who followed the examples of those military chiefs, who shut up their troops in intrenchments and strong holds, in order to cover them from the attacks of the enemy. Of this number were the Jesuit Veron, who required the Protestants to prove the tenets

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tenets of their church by plain passages of scripture, without being allowed the liberty of illustrating those passages, reasoning upon them, or drawing any conclusions from them; Nihufius, an apostate from the Protestant religion; the two Walenburgs, and others, who confined themselves to the business of answering objections and repelling attacks; and cardinal Richelieu, who restricted the whole controversy to the single article of the divine institution and authority of the church. The Methodists of the second class were of opinion, that the most expedient manner of reducing the Protestants to silence, was not to attack them partially, but to overwhelm them at once, by the weight of some general principle or presumption, some universal argument, which comprehended, or might be applied to all the points contested between the two churches: thus imitating the conduct of those military leaders, who, instead of spending their time and strength in sieges and skirmishes, endeavour to put an end to the war by a general and decisive action. These polemics rested the defence of popery upon prescription; the wicked lives of Protestant princes who had left the church of Rome; the crime of religious schism; the variety of opinions among Protestants, with regard to doctrine and discipline; and the uniformity of the tenets and worship of the church of Rome. To this class belong Nicole, the Jansenist doctor, the famous Bossuet, &c. *Mosh. Eccl. Hist.* vol. v. 8vo.

The *Protestant* Methodists form a very considerable class, principally of the lower people in this country. They sprung up about the year 1729, at Oxford, and were soon divided into two parties, the one under the direction of the two brothers, John and Charles Wesley, and the other under that of Mr. George Whitefield, who joined them in the year 1735. These leaders, and, if we except Mr. William Law, the celebrated mystic, founders of Methodism, were educated at Oxford, and received episcopal ordination; and always professed themselves advocates for the articles and liturgy of the established church: though they commonly practised the dissenting mode of worship. The appellation of Methodists is said to have been derived from the regular distribution of their time, their orderly and composed demeanour, and the supposed purity of their religious principles. Conceiving a design of forming separate communities, superior in sanctity and perfection to all other Christian churches, and impelled to a very considerable degree by a zeal of an enthusiastic and extravagant kind, they became itinerant preachers, and, being excluded from most of our churches, exercised their ministry in private houses, fields, &c. not only in Great Britain and Ireland, but also in America: thus collecting a very considerable number of hearers and proselytes, both amongst the members of the established church and the dissenters. The theological system of Mr. Whitefield and his followers is Calvinistic: that of Mr. Wesley and his disciples, Arminian; and the latter maintain the possibility of attaining sinless perfection in the present state. The subordinate teachers of both these classes of Methodists are generally men of no liberal education, and they pretend to derive their ministerial abilities from special communications of the spirit. The Methodists of both parties, like other enthusiasts, make true religion to consist principally in certain affections and inward feelings, which it is impossible to explain, but which, when analysed, seem to be mechanical in their spring and operation, and they generally maintain, that Christians will be most likely to succeed in the pursuit of truth, not by the dictates of reason, or by the aids of learning, but by laying their minds open to the direction and influence of divine illumination: and their conduct has been directed by impulses.

Such is the account given of the followers of Whitefield in *Mosheim's Eccl. Hist.* translated by Dr. Maclaine (vol. vi. p. 36. ed. 1811, 8vo.); but though it may be true in general, as comprehending Methodists of both descriptions, at their first rise and in their early progress, it admits, in the present state of this sect, of many exceptions; and it would be unjust and unandid to charge upon a whole body of Christians, respectable both as to number and character, the errors in sentiment and irregularities in practice, into which the excesses of enthusiasm may have betrayed some of their number. Much as we may disapprove these errors and irregularities, truth requires us to declare from our own knowledge, that those who have passed under the denomination of Methodists have been eminently useful in awakening into consideration the unthinking, and in restraining the profligate, among the lower classes of mankind. We perceive with satisfaction a change of conduct: the idle and dissolute have become diligent and virtuous; religion finds votaries among those who were accustomed to treat it with neglect and contempt; the state of families has been amended, and the community in general, composed of individuals and of domestic associations, has derived benefit from the assiduity and zeal of the Methodists. We look forward with pleasure to a period, when, by the diffusion of knowledge among persons in the inferior stations of life, many of those who are now deemed erroneous enthusiasts will become enlightened, rational, and exemplary Christians. Having rendered this tribute of justice to the Methodists in general, we shall now proceed to give a more particular and detailed account of the two leading classes into which they have been divided.

The opinions of Mr. Whitefield, which we have already stated to have been Calvinistic, as well as his piety, recommended him to the notice of a devout peeress, the countess dowager of Huntingdon, who became his patron, and liberally promoted the erection of meeting-houses for the Calvinistic Methodists; and when her preachers could not obtain episcopal ordination, established a college at Trevecca, in Breconshire, not far from Brecknock, for the education of ministers in the Whitefieldian connection. This seminary, not being endowed, expired with the countess; but a new one was soon after established at Cheshunt, which has furnished the Methodists of this description with useful preachers.

We may here observe, that the proselytes of Whitefield were less numerous than those of Wesley; and that their association was less compact. Their ministers and places of worship were respectively supported by the different congregations, aided for a time by the liberality of the countess above-mentioned and her friends in the higher ranks of life; not, like those of the Wesleyan sect, by a general fund. The former had no annual assembly for the government of the whole body; but the latter had a regular session, under the name of a "Conference," in which the affairs and the circumstances of the confederacy were investigated, funds provided, abuses corrected, and grievances redressed. This meeting was composed of preachers chosen by the assemblies of different "districts" as representatives of the Methodist connection, and of the superintendants of the "circuits," or inferior divisions. It was at first limited to 100 of the senior itinerant preachers; but, in process of time, all the preachers were permitted to assist, if they were so inclined, or had an opportunity of attending. At first, laymen were allowed to preach; but ministers were afterwards ordained for that purpose by the clerical heads of the society. Our readers hardly need to be informed, that Wesley and some of his associates had taken orders in the church of England; and this circumstance increased their ministerial respectability in the general estimation; but it gave them no additional importance

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importance in the opinion of the peculiar votaries of this connection, who were disposed to listen with profound attention to the effusions of the lowest and most illiterate mechanics. Mr. Wesley, speaking of these unlettered men, affirmed, that they had "help from God for that great work, the saving of souls from death, since he had enabled, and did enable them still, to turn many to righteousness.—Thus hath he destroyed the wisdom of the wise, and brought to nought the understanding of the prudent." Mr. Wesley introduced among his followers "agapæ," or love-meetings. Once in every quarter of a year, after the religious service of the day, a considerable number of persons, of both sexes, "broke bread" with each other. Alms were then collected for the poor members of the society. At these meetings the preachers and others related their respective "experience," and the service was enlivened by hymns, which were sung at certain intervals. These love-feasts were derived from the Moravians, with whom Mr. Wesley at first associated, but whose communion he soon renounced. In order to counteract the misconceptions which some persons might form of the character of the Methodists, Mr. Wesley stated the "distinguishing marks" of his followers. These marks, he said, were to be found, not in "their opinions of any sort," in their words and phrases, or in any desire of being "distinguished by actions, customs, or usages, of an indifferent nature, undetermined by the word of God;" nor did they lay the whole stress of religion upon any single part of it. But they were distinguished by having the love of God shed abroad in their hearts, by being always happy in God, ever resting on him, giving thanks for every thing, praying constantly with earnestness and fervour; by purifying their hearts from the lust of the flesh and of the eye, from envy and malice, from pride and petulance; by doing kind offices to neighbours and strangers, to friends and enemies; and by other fruits of a "living faith." Nothing, he added, was required by St. Paul but the faith here mentioned. By that alone could any one be justified, or accounted righteous before God; and the remission of sins could only be obtained through the merits of Christ, not by the good works or supposed deserts of individuals. Holiness of heart and life would flow from such faith; but good deeds without it would be inoperative and nugatory. No man could produce it in himself, as it was the work of omnipotence. It was the free gift of God to those who were before "ungodly and unholy, and fit only for everlasting destruction." He who received it was born again, yet was not so perfectly regenerate, as to be fully sanctified; for there would still be some struggles between the old and the new man, which would not cease before the Holy Spirit had given to the zealous Christian "a new and clean heart." He would then attain the "acmé" of sanctification, and be qualified for the society of "just men made perfect."

Among these Methodists dissentions existed at the time of the decease of their founder; but an interval of six years elapsed before their difference of sentiment produced an actual separation. The liberties of their church, and the rights of the people, formed the grounds of dispute. On pretence of giving due support to the plan of itinerancy, some leading ministers had endeavoured to obtain an exorbitant degree of power over the community and junior preachers; and they managed the conference in a way which tended to secure this power. Disgusted at these arbitrary proceedings, Mr. Kilham, and other members of the sect, applied to the general assembly for a redress of grievances, and for an admission of the laity to a proper share in the general government of the society. Repeated applications and remonstrances being wholly fruitless, and

Mr. Kilham being expelled from the fraternity by the ruling party, about 5000 discontented members seceded from the connection in the year 1797, and formed independent arrangements on a popular basis. Another body of seceders, assuming the uncouth appellation of "Christian Revivalists," "claimed," says an historian of the Wesleyan sect, "a right to indulge their propensities to prayer and praise, at all times, and on all occasions." See Nightingale's "Portraiture of Methodism," cited in the last edition of Mosheim's Eccl. Hist. by Dr. Coote, vol. vi. p. 308—315. 8vo.

Before we close this article, we shall observe that Methodists of both descriptions are, in general, members of the established church; though they have been erroneously confounded with Protestant dissenters. Mr. Wesley would never allow of a separate communion, and required his followers to frequent the established church, when they had no opportunity of hearing their own preachers, and there to communicate. Of late, indeed, some alteration has taken place in this respect; and parties of the Wesleyans approach more nearly in principles and practice to Protestant dissenters. It is also well known, that the Methodists in Mr. Whitefield's connection, though intermixed with many who call themselves Dissenters, belonged for the most part to the church; and their more general departure from it was occasioned, when, at the request of the pious countess above-mentioned, episcopal ordination was refused to her ministers. Few of them yet understand or adopt the discriminating principles of Dissenters. The ministers, who have been qualified for the exercise of their functions by ordination according to the rites of the church, and who still continue in it, are in popular language called Methodists, or now, more generally, *evangelical* clergy; an appellation appropriating to themselves a distinguishing and peculiar character, which others of their own body are not disposed to allow them, and which, as some of them say, is, with respect to their sentiments and preaching, invidious and degrading. It is our province, in a work of this nature, to state facts and opinions justly and candidly as far as we are able; and we leave contending parties, both *in* and *out* of the church, to settle their differences among themselves.

METHODISTS, in *Medical History*, a title assumed by a sect of physicians at Rome, in order to distinguish themselves from the two opposite sects, the Empirics and Dogmatists, (see EMPIRIC,) with either of which they refused to arrange themselves. The Methodist physicians, as Celsus informs us, generally considered Themison as their founder, who was followed as a leader by Theophilus, and afterwards by Soranus of Alexandria, the last of whom practised at Rome, during the reigns of Trajan and Hadrian. A bold charlatan, Aesclepiades, who settled at Rome about the time of the Mithridatic war, was the first, however, who maintained the principles adopted by this sect. Borrowing the doctrine of atoms laid down by Epicurus, he attempted to account for all diseases upon the obstruction to the circulation of the atoms, occasioned by two opposite states of the system, which he denominated *strictum* and *laxum*, or states of constriction and relaxation. Every disease, which exhibited obvious marks of retention, or appearances of hardness, tumefaction, or external inflammation, was ascribed to the state of constriction; and the opposite phenomena of augmented discharges, softness and diminution of bulk, to the condition of laxity. This doctrine became popular, partly in consequence of the self-confidence of its professors, and the loudness of their declamation against former systems, and partly from the precision and formality of the regimen which they prescribed: and its progress was, perhaps, not
a little

a little aided by the simplicity with which it seemed to explain all the phenomena of disease, and by the indulgence which it sanctioned in the practitioner; inasmuch as it rendered all nice discrimination of symptoms, and particular investigation of local disease, unnecessary. It was enough to ascertain the class in which any disease was to be arranged, and the general treatment would serve for all; the observation both of exciting and of proximate causes was deemed entirely superfluous. "As soon as it was known," says Celsus, "to which of these classes a disease belonged, if the body were bound, it must be opened; if it laboured under a flux, it must be restrained; and if it were of a mixed nature, the most urgent remedy must be first opposed." For they were obliged to admit, in some cases, the insensibility of both *stricture* and *luxum* occurring at the same time, in different organs of the body.

The absurdity of founding the practice of medicine upon these very general principles has been pointed out, with his usual force, by Celsus. He considered the Methodists as even below the Empirics, in the accuracy of their practical views: since the Empirics attended to many circumstances of a disease, while the Methodists only observed the most obvious, and even the most common appearances. Like the farriers, who superintend the diseases of sheep and cattle, but cannot learn from these dumb animals the peculiar symptoms of their complaints, they regard only a few, which are common to all. "Neque adjectum quicquam Empiricorum professioni, sed demum est; quoniam illi multa circumspiciunt, hi tantum facillima, et non plus quam vulgaria. Nam et hi, qui pecoribus ac pimentis medentur, cum propria e jusque ex mutis animalibus nosse non possint, communibus tantummodo insillunt." (Cels. de Medicina. *Præf.*) This intelligent writer then goes on to shew the insufficiency of such general indications in practice. In the state of laxity, for instance, he remarks, "it is one thing to vomit bile, another to vomit blood, and another to reject the food; and there is much difference between a simple purging, and one attended with tormina; *i. e.* between a mere diarrhœa and a dysentery; and likewise between a waiting from profuse sweats, and a mere marasmus. And not one of these complaints is to be cured exactly in the same manner as another."

We have already pointed out the similarity between this doctrine and that of the Brunonian system, which has been the cause of much controversy in our own times; the distinguishing features of which were, the reference of all diseases to two opposite conditions of the constitution, *spbenia* and *asthenia*, or strength and debility, (which might with almost equal propriety have been called *strictum* and *luxum*.) and the consequent exclusion of all particular investigation of the minute distinctions in the phenomena of diseases, which it encouraged. See *MEDICINE, History of*.

The practice of the Methodists was particularly distinguished by their rejection of purgative medicines; by their rigid and formal regimen, especially in the methodical abstinence which they enforced for a certain number of days; and by their copious use of warm ablutions, fomentations, cataplasms, and frictions with oil, together with free bleeding, in diseases ascribed to stricture; and a similar routine with cold drinks, and cold and corrugating applications, in disorders attributed to laxity. An epitome of *methodic* medicine has been handed down by Cælius Aurelianus, who translated the original work of Soranus, which is lost. See his treatise "De Morbis Acutis et Chronicis:"—also Le Clerc Hist. de la Médecine; Walker's Memoirs of Medicine.

METHODIUS, in *Biography*, a Christian bishop and

martyr, who flourished towards the close of the third century; and unless there were two of the same name, who lived about this period, he was bishop of several places, *viz.* of Olympus, in Lycia, of Tyre, and of Patara, &c. He is not mentioned by Eusebius in his Ecclesiastical History, which has been ascribed, yet without probability, to his resentment against him for having written with severity against Origen, of whom, it is known, that Eusebius was a great admirer. There were two opinions concerning the death of this prelate; some say he suffered under Decius, or Valerian, and others contend, that he was one of those who suffered in Dioclesian's persecution. He is highly applauded by Epiphanius, Jerome, and others, by whom he is characterized as a learned and eloquent man, and a zealous defender of the truth. Lardner has given a pretty full account of his works, for which we refer to the third volume of the 8vo edition, 1783. This learned and candid critic says, that in the Remains of Methodius there are many interpretations of texts of scripture, which, in his opinion, do little honour to the author's judgment, and he gives instances in proof of this decision. Dr Lardner likewise observes, that the Remains of Methodius clearly prove, that he admitted into the canon of the holy scriptures the four gospels, the acts of the Apostles, the epistles of St. Paul, and the epistle to the Hebrews as one of them. He also owned as authentic the first epistle of St. Peter, and the first of St. John. His opinion about the rest is not known. He quotes the Revelations as a book of sacred scripture, written by John, whom he probably regarded as the apostle and evangelist. Lardner.

METHODIUS, surnamed the *Confessor*, who flourished about the middle of the ninth century, was born at Syracuse. Having received a good education, he went to Constantinople, where he embraced a religious life, and took up his residence in a monastery at the isle of Chios. He was afterwards ordained priest by the patriarch Nicephorus, and upon the expulsion of that prelate from the see of Constantinople, was sent by him to Rome to implore assistance from pope Paschal in his behalf. Upon his return to Greece, after the death of that patriarch, he signalized himself by his zeal for image-worship, on which account he was committed to prison, and endured many indignities for several years. He recovered his liberty completely in the year 842, and was in a short time preferred to the patriarchate of the church of Constantinople. As soon as he was quietly settled in his see, he introduced the superstition of image-worship into the Greek church. Methodius died in the year 847. He was author of several works, among which was a "Constitution, or Manual for Persons who, after having apostatized, returned again to the Profession of the Christian Faith." Moreri. Mosheim's Eccl. Hist.

METHONICA, in *Botany*, Just. 48. Herm. Lugd. Bat. 688. t. 689, the Malabar name of the Superb Lily. See GLORIOSA.

METHUEN, in *Geography*, a town of America, in Essex county, Massachusetts, on the N. bank of Merrimack river, between Dracut and Haverhill. It contains two parishes and 1253 inhabitants.

METHULLY, a town of Hindoostan, in Guzerat; 15 miles S.W. of Gogo.

METHWOLD, a small market-town in the hundred of Grimshoe and county of Norfolk, England, is situated four miles from Stoke Ferry, and 86 from London. It derived its name from its site, and was anciently written Methelwalde, or Midlewolde, being the wold between Northwolde and Hockwolde. The church, which appears to have been built in the reign of Edward II., is a regular edifice with

a nave, aisles, and chancel. At the west end of the nave is a square tower, embattled; on this is raised another tower of an octangular shape; and from the latter rises a spire. The population of Mettwold in the year 1801, according to the return then made to parliament, was 865, occupying 134 houses. The market, which is kept on Tuesdays, was formerly considerable, but is now almost difused: an annual fair is held on St. George's day. The town has been, from time immemorial, proverbially famous for its extensive rabbit warrens.

In this parish stood Stevesholm or Shisham priory, which was given by William earl of Warren, in the reign of king Stephen, as a cell to the priory of Castle Acre. At the dissolution it was granted to the family of Mundeford, and was afterwards conveyed to that of Seabright. Blomefield's History of Norfolk, vol. ii. Beauties of England, vol. xi. by J. Britton.

METI, a town of Abyssinia, near the coast of the Red sea. N. lat. $13^{\circ} 30'$. E. long. $42^{\circ} 30'$.

METIMCUS, two islands of America, near the coast of Main. N. lat. $43^{\circ} 50'$. W. long. $68^{\circ} 15'$.

METIMIN, a town of Ruffia, near the Pacific ocean. N. lat. $64^{\circ} 55'$. E. long. $180^{\circ} 34'$.

METITCHE, or ΜΕΤΤΙΧΙΑΙ, a plain in the territory of the city of Algiers, which commences about half a mile N.E. of the city and stretches 50 English miles in length, and 20 in breadth, as far as the branch of mount Atlas, at the foot of which lies the town of "Belida." This plain is well cultivated and well watered, and is in this respect superior to the other districts of the kingdom. It is justly reckoned, as Shaw says, the garden of the whole kingdom.

METIUS, ADRIAN, in *Biography*, a celebrated Dutch mathematician, who flourished in the 16th and 17th centuries, was a native of Alkmaer. He pursued his studies at a German university, where he afterwards taught the mathematics with great reputation for several years, and afterwards became professor of those sciences at the university of Franeker. He was author of several books on spherics, astronomy, and arithmetic. He had a brother James, for whom he claimed the honour of having been the first inventor of the telescope; but according to Borelli's account of the discovery of that instrument, it is highly improbable, as it is generally believed, that Zacharias Jansen, a spectacle maker at Middleburg, was the original inventor, (see TELESCOPE,) and that James Metius purchased telescopes of Jansen's children, by which he became acquainted with their construction and principles.

METKERKE, ADOLPHUS VAN, was born at Bruges in 1528, and spent the greatest part of his life in the service of the revolted states of the Low Countries, in the quality of counsellor of state, and envoy to the foreign potentates. In the latter station he was at the court of queen Elizabeth, when he died, in 1591, of grief, it was said, on account of the loss of his son Nicholas, an active commander before Deventer. He was a man of great learning, and was author of the following works; "A Translation, with Notes, of some Pieces of Theocritus, Bion, and Moschus;" "Latin Poems;" "A Treatise in Latin on the true Pronunciation of the Greek Language;" "A Collection of the Proceedings at the Peace concluded at Cologne in 1579." He took a part in other works, particularly in "The Lives of the Cæsars;" "The Medals of Magna Grecia," and "The Fasti Consulares," published by Goltzius.

METO, or METON, a celebrated mathematician of Athens, who flourished 432 B.C., was the son of Pausanias. He observed, in the first year of the 87th Olympiad,

the solstice at Athens, and published his cycle of 19 years by which he endeavoured to adjust the course of the sun and moon, and to make the solar and lunar years begin at the same point of time. This is called the Metonic period, or cycle. It is also called the golden number, from its great use in the calendar. (See CYCLE.) It is known that Meton was living about the year 412 B.C., for when the Athenian fleet was sent to Sicily, he escaped from being embarked on that disastrous expedition by counterfeiting an appearance of idiotism. Moreri.

METOCHE, ΜΕΤΟΧΕ, in the *Ancient Architecture*, a term used by Vitruvius, to signify the space or interval between the dentils. See DENTICLES.

Baldus observes, that, in an ancient MS. copy of that author, the word *metatome* is found for *metoche*. Hence Daviler takes occasion to suspect, that the common text of Vitruvius is corrupted, and concludes, that it should not be *metoche*, but *metatome*, q. d. section.

METOCHITA, THEODORE, in *Biography*, a modern Greek historian, who flourished in the 13th and 14th centuries. He attained to high honours in the Constantinopolitan empire, but in the reign of Andronicus the younger, he was banished and his goods confiscated. He was afterwards recalled, and ended his life in a monastery of his own foundation, in 1332. He was a man of extensive and very deep learning, and was entitled by his contemporaries a living library. He wrote "A Compendium of Roman History, from Julius Cæsar to Constantine," first published with notes and a Latin version by Meursius, in 1618; "A Constantinopolitan History," in one book; "A sacred History;" and "A Paraphrase on Aristotle's Physics."

METONIC CYCLE, in *Chronology*. See CYCLE, and GOLDEN NUMBER.

METONYMY, ΜΕΤΩΝΥΜΙΑ, from μετα, *trans*, and ονομα, *nomen, name*; a rhetorical trope consisting in a transmutation or change of names; or a putting of the effect for the cause, or the subject for the adjunct; and *vice versa*.

The metonymy is the most considerable of all the tropes next to a metaphor, whether we consider its force and elegance, or the frequent use of it both in speaking and writing. It is sometimes also called *transnominatio*, and differs not much from the hypallage.

There are four kinds of metonymies in principal use: the first, called a metonymy of the cause, when the external cause is put for the effect; this cause is either efficient or final. Of the former kind are such metonymies, where we put the inventor for the thing invented; as Bacchus for wine, Ceres for bread. Metonymies of the final cause are such, by which the end in doing a thing is put for the thing done. Such is that of Virgil (Eclog. x. v. 41.), "Phyllis should garlands crop," by which are meant flowers for making garlands. The second metonymy puts the effect for the cause, whether the agent or only the means and instrument: thus Virgil, Æn. vi. v. 844, calls the two Scipios the destruction of Libya, because they were the agents who effected it; and Horace, Carm. i. 1, 2, compliments Mæcenas with the titles of being his guard and honour, that is, his guardian and the author of his honour: and the author is put for his works. The third is, when the subject is put for the adjunct. By subject here, in a large sense of the word, may be understood that, wherein some other thing is contained, or about which it is conversant; as likewise the possessor with respect to the thing he possesses, and the thing signified when put for the sign of it: thus, in the first of these ways, the seat of any faculty or affection is put for the faculty or affection itself; as in the phrases, a man of a clear head or of a warm heart: the place, where any actions are performed, is put for the actions

actions done in it; the country or place of residence for the inhabitants; the time for the persons living in it: in the second way, the object is used for the person, or thing employed about it: as when Cicero, *pro Mil.* cap. 4. says, in time of battle, the laws, *i. e.* the judges, are silent. By the third way, we say to destroy or ruin a man, meaning not his person but his estate. In the last way, statues and pictures are called by the names of the persons whom they represent.

The fourth kind of metonymy is that in which the adjunct is put for the subject, which is done in the same variety of ways as the former. Thus Virgil says, (*Æn.* i. v. 704.) "they lie down upon purple," that is, couches dyed with purple. Also, "Hope deferred maketh the heart sick," where hope is put for the thing hoped for. Titus is thus called by Suetonius "the love and delight of mankind." Thus also, we say of a person, "He has served to many campaigns," meaning so many summers. Moreover, thus a "sceptre" is put for the regal dignity, and the "sword" for the authority of the magistrate.

Vossius adds two other species of metonymy, *viz.* of the antecedent and the consequent, which bear some analogy to the cause and effect, as the one does at least give occasion to the other. By the former, "to hear," when spoken of a superior, sometimes signifies to grant or comply with, and of an inferior to obey: by the latter it is not unusual to say, "I subscribe," or set my hand to such a thing, meaning that we assent or agree to it, &c.

METOPE, or ΜΕΤΟΠΑ, in *Architecture*, the square space or interval between the triglyphs, in the Doric frieze.

The word, in the original Greek, signifies the distance between one aperture or hole and another, or between one triglyph and another; the triglyphs being supposed to be solives or joists that fill the apertures. It is derived from μέτα, *inter, between,* and οπή, *foramen.*

The ancients used to adorn these parts with carved works, or paintings representing the heads of oxen, vessels, basons, and other utensils of the heathen sacrifices.

As there is found some difficulty in disposing the triglyphs and metopes in that just symmetry which the Doric order requires; some architects make it a rule, never to use this order but in temples.

METOPÉ, *Semi*, is a space somewhat less than half a metope, in the corner of a Doric frieze.

Le Clerc observes, that the beauty of metopes consists in their regularity, on appearing to be perfect squares; and yet, when they are equally square, they appear to be less in height than in breadth, on account of the projection of the little bandelet; for which reason they should be made a minute or two more in height than in breadth, in order to make their appearance uniform.

He also observes, that when the triglyphs and metopes follow each other regularly, the columns must only stand one by one; excepting those of the inner angles, which ought always to be accompanied by two others, one on each side; and here it is worth remarking, that these two columns, which accompany that of the angle, are not less necessary on account of the solidity of the building, than of the regularity of the intercolumniations.

METOPIMUM, in *Botany*, a name given by Pliny to the plant which produces the gum ammoniacum. He says that the ancient Greeks called it also by this name, but in that he errs. See AMMONIAC.

METOPOSCOPY, ΜΕΤΩΠΟΣΚΟΠΙΑ, from μέτωπον, *frons, forehead,* and σκοπία, *inspection, or observation,* I view, the art of discovering the temperament, inclinations, and manners

of persons, by inspecting their features, and the lines in their faces, and especially of their forehead.

Metoposcopy is no more than a branch of physiognomy; the latter taking its conjecture from all parts of the body; but both the body and the branch are extremely precarious, not to say vain.

Ciro Spantoni, who has written on the subject of metoposcopy, observes, that there are seven principal lines to be considered in the forehead; each of which has its peculiar planet. The first is the line of Saturn, the second of Jupiter, &c.

METOSIS, in *Surgery*, an amaurosis, or rather a blindness, from excessive short-sightedness, since *amaurosis* implies that the defect of sight is owing to torpor, or insensibility of the retina and optic nerve. See CUTTA *Serena*.

METRAIENNY, or ΜΙΝΙΕΤ ΡΑΙΗΝΙ, in *Geography*, a town of Egypt; 6 miles S. of Gizeli.

METRAMA, a river of Naples, which rises in Calabria Ultra, and runs into the Mediterranean; 4 miles S. of Nicotera. N. lat. 38 30'. E. long. 16 15'.

MÈTRE, or ΜΕΤΡΗ, ΜΕΤΡΩ, in *Poetry*, denotes a system of feet of a just length. Aristides defines metre, a system of feet composed of dissimilar syllables, of a just extent. In which sense metre amounts to much the same with genus carminis, or the sort of verse, and differs from rhythm. See PROSOODY.

It was during the reign of Edward VI. that metrical psalmody, in the same manner as is still practised in our parochial churches, had its beginning, or at least became general in England, by the version of Thomas Sternhold, John Hopkins, and others; which, though it now appears bald, coarse, and despicable, was then equally refined with the poetical taste of the most polite courtiers and polished scholars of the nation. But time, which has added strength and energy to the *prose* translation of the psalms, as well as other parts of scripture, and made them still more venerable, has rendered the *verse* of these translators a disgrace to our literature and religion. See PSALMODY, *Metrical*, CLEMENT MAROT, GOUDIMEL, and CLAUDE LE JEUNE.

METRE, in the *French Measures*, is the ten millionth part of a quadrant of the meridian, which is adopted as the unit of length; and from which, by multiplication and division, all other measures are derived. The length of the quadrant was computed by measuring an arc of the meridian between the parallels of Dunkirk and Barcelona, and found to be 5,130,740 French toises. This number, divided by ten millions, gives 443,296 French lines, the length of the metre, which is equal to 36.9413 French inches, or 39.3702 English inches. See MEASURE and STANDARD.

METRE, or *Meter*, a measure for oil and other liquids in Turkey. The meter weighs eight okes, or 22½ lb. avoirdupois.

METRETES, the name of a measure used among the ancients, containing somewhat more than nine gallons.

METRICAL VERSES, are those consisting of a determinate number of long and short syllables; as those of the Greek and Latin poets.

Capellus observes, that the genius of the Hebrew language is incompatible with metrical poetry.

METRICE, or METRICA, among the *Ancients*, was that part of poetry employed about the quantities of syllables, feet, sorts of metre, or verse, &c.

METRO, in *Geography*, a river which traverses the duchy of Urbino, and runs into the Adriatic, N. lat. 43 50'.

METROCELIDES, from μητηρ, *a mother,* and χηλιδις, *a mole,* in *Surgery*. See NÆVUS *Maternus*.

METROCOMIA, from μητηρ, *mother,* and χωμη, *town,* or *village,* a term in the *Ancient Church History*, signifying a

borough, or village, that had other villages under its jurisdiction.

What a metropolis was among cities, a metrocomia was among country towns. The ancient metrocomia had each its chorepiscopus or rural dean, and here was his see or residence. See METROPOLIS and CHOREPISCOPI.

METROMETER, Fr., a machine to determine the time of a piece of music. It requires a pendulum, which, while a movement is performing, may be lengthened or shortened at the pleasure of the composer, till the oscillations exactly agree with the bar, or any of its accented parts. The length of the pendulum must be specified at the beginning of a piece. Many attempts at such an expedient have been made; but we believe it has never been brought to perfection: if it had in Handel's time, many of his compositions would not be frequently injured by being performed too fast or too slow, to satisfy those who remember his works performed under his own direction.

METRONOMII, Μετρονομοι, among the Athenians, officers that inspected all sorts of measures, except those of corn; there were five of them in the city, and double that number in the Pyræus, in which the greatest mart in Attica was kept.

METROPI, in *Geography*, a town of European Turkey, in the province of Livadia; 28 miles S. of Athens.—Also, a small island in the gulf of Engia; 3 miles W. of Engia.

METROPOLI, a town of the island of Crete or Candia, said to be situated on the site of the ancient *Gortyna*; which see; 22 miles S. of Candia. N. lat. 35° 1'. E. long. 25° 4'.

METROPOLIS, Μετροπολις, from μητηρ, *mother*, and πολις, *city*, the *mother-city*, &c. the capital of a country, or province: or the principal city, and, as it were, mother of all the rest.

METROPOLIS is also applied to archiepiscopal churches, and sometimes to the principal, or mother-church of a city. The Roman empire having been divided into thirteen dioceses, and one hundred and twenty provinces, each diocese and each province had its metropolis, or capital city, where the proconsul, or the vicar of the empire, had his residence.

To this civil division the ecclesiastical was afterwards adapted, and the bishop of the capital city had the direction of affairs, and the pre-eminence over all the bishops of the province. His residence in the metropolis gave him the title of *metropolitan*. See DIOCESE.

The erection of metropolitans is referred to the end of the third century, and was confirmed by the council of Nice. Indeed archbishop Usher, and De Marca, maintain it to be an establishment of the apostles; but in vain: for it is next to certain, that the ecclesiastical government was regulated on the plan of the civil; and that it was hence the name and authority of metropolitans were given to the bishops of the capital cities of the empire, or the provinces that composed it. This is so true, that, in the contest between the bishop of Arles and the bishop of Vienne, each of whom laid claim to the metropolitanship of the province of Vienne, the council of Turin appointed, that whichever of them could prove his city to be the civil metropolis, should enjoy the title and rights of ecclesiastical metropolitan.

Nothing is more evident than the perfect equality that reigned among the primitive churches; nor does there even appear, in the first century, the smallest trace of that association of provincial churches, from which, says Mosheim, councils and metropolitans derive their origin. (See DIOCESE.) The order and decency of those assemblies which were called councils, and introduced towards the close of the second

century, required, says this author, that some one of the provincial bishops met in council, should be invested with a superior degree of power and authority; and hence, he adds, the rights of metropolitans were derived. See PATRIARCHS.

Though the ecclesiastical government, however, was modelled on the political, yet, in Gaul, and some other countries, the distinctions of metropolitan and primate were not observed till very late. As the præfectus Galliarum resided by turns at Trevoux, Vienne, Arles, and Lyons, he communicated the rank and dignity of metropolitan and primate to each of them in their turn; and yet none of the Gallican bishops assumed to themselves the rights, nor even the precedence, of metropolitans. The episcopate levelled them all, and they had no regard but to the privileges of seniority. This equality lasted till the fifth century, when the contest between the bishops of Vienne and Arles was set on foot.

M. Du Pin observes, that in the provinces of Africa, excepting those of which Carthage was the metropolis, the place where the most aged bishop resided became the metropolis: the reason of which, without doubt, was this, that neither the proconsul, nor præfectus, ever fixed their residence any where.

The same author observes, also, that in Asia there were metropolitans merely nominal; that is, which had no suffragan, nor any rights of metropolitans. The bishops of Nice, Chalcedon, and Berytus, had the precedence of the other bishops, and the title of metropolitans, but this, without any other prerogative besides the honour of the appellation; they themselves being subject to their metropolitans.

A metropolitan has the privilege of ordaining his suffragans; and appeals from sentences passed by the suffragans are preferred to the metropolitan. See ARCHBISHOP.

The name metropolis was originally given to those Greek cities, which had established colonies in other places; and to these certain rights or privileges belonged, partly *honorary*, and partly *profitable*. Those of the first kind principally related to religion. *E. g.* The colonies were obliged to send annually to their metropolis deputies for offering sacrifices on their behalf to the gods of the country, and to present to them their first fruits. If the sacred fire should by any accident be extinguished, the colonies could not rekindle it any where but in the prytæneum of their founders. The colonies were under an obligation to provide themselves with priests, particularly those of their tutelar deity from their metropoles. The first places in the public solemnities, their games, &c. belonged to citizens of their respective metropolis. It was also the custom for the colonies to adorn the temples of their ancient country with considerable presents, such as the spoils of enemies, trophies, statues, and other embellishments; and it was also usual for the greater number of the Greek cities to pay a yearly tribute of certain measures of grain to that of Athens. Among the profitable rights we may reckon the following: the citizens of the metropolis had power of forming alliances, contracting marriages, &c., without having their children considered as strangers; they had likewise the power of purchasing land, and other commodities, in the territory of the colonies; the rights of hospitality took place between the metropolis and its colonies; and, moreover, the metropolis had a right of appointing legislators for their colonies, establishing their form of government, and reviving certain practices that had been abolished: they might also send new citizens into their colonies, who might share in common the benefits of the ancient colonists: generals were sometimes obtained from the metropolis, and new establishments required its sanction; but the most important right was that of demanding

warding succour from its colonies in time of war, both of soldiers and of ships, and affording an asylum to the citizens of the besieged metropolis. Besides these general privileges, some metropolises had peculiar claims on their colonies. The metropolis, on the other hand, had certain services which they were required to perform on behalf of their colonies; and if they failed, the colonies were justified in withdrawing from them their respect and obedience. The title of metropolis was less regarded among the Romans; for though they multiplied their colonies, they had but one metropolis, which was Rome; and as this was the first city of an immense empire, they considered the inhabitants of colonies merely as subjects. In general, however, they regarded as metropolises the cities which we call "capitals," and these were places, in which were held the general assemblies of the province, or where existed tribunals of the last resort.

METROPROPTOSIS, from $\mu\epsilon\tau\rho\upsilon\sigma\iota\varsigma$, *the womb*, and $\pi\rho\omicron\upsilon\tau\iota\varsigma$, *to fall down*, in *Surgery*. See **PROLAPSUS Uteri**.

METROSIDEROS, in *Botany*, so named by Dr. Solander, from $\mu\epsilon\tau\rho\upsilon\sigma\iota\varsigma$, *the pith or heart of a tree*, and $\sigma\iota\delta\epsilon\rho\iota\varsigma$, *iron*, alluding to the hardness and colour of the wood.—Sm. Tr. of Linn. Soc. v. 3. 266. Willd. Sp. Pl. v. 2. 952. Mart. Mill. Diét. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 183. Gærtn. t. 34. f. 2. and f. 9. Lamarek Illustr. t. 421. f. 3. (Angophora; Cavan. Ic. v. 4. 21. Leptospermum; Forst. Gen. t. 36. f. a—e and m—t.)—Class and order, *Icosandria Monogynia*. Nat. Ord. *Hepterideae*, Linn. *Myrti*, Juss.

Gen. Ch. Cal. Perianth half superior, with five spreading teeth or segments. Cor. Petals five, roundish, concave, inserted into the rim of the calyx, alternate with its segments; rude, and often rough, at the keel externally. Stam. Filaments numerous, inserted into the calyx in several rows, thread-shaped, much longer than the corolla; anthers small, roundish, two-lobed. Pist. Germen in the bottom of the calyx, roundish; style simple, angular, erect, much shorter than the stamens; stigma quite simple. Peric. Capsule roundish or ovate, coated in the lower part, of three cells, and as many abrupt valves, bursting at the upper part, the partitions from the centre of the valves. Seeds several, imbricated, roundish or oblong, inserted into the central column.

Eff. Ch. Calyx five-cleft, half superior. Petals five. Stamens much longer than the corolla. Stigma simple. Capsule of three cells.

Sir Joseph Banks and Dr. Solander first distinguished this genus from **LEPTOSPERMUM** and **MELALEUCA**; see those articles. To the latter it is most allied in habit, but differs in having distinct and simple stamens. The length of those organs, but more especially the simple, not capitate, stigma, distinguishes it from *Leptospermum*, and the habit is totally different. Most of the species are large handsome shrubs or trees, with long or broad, mostly smooth and entire, leaves, and fine large, white or crimson, flowers, conspicuous for their long and copious stamens. These plants are disposed in two sections, according to the situation of their leaves.

Section 1. *Leaves opposite.*

1. *M. hispida*. Rough *Metrosideros*. Sm. Tr. of L. Soc. v. 3. 267. n. 1. Exot. Bot. v. 1. 81. t. 42. Ait. n. 1. (*M. anomala*; Vent. Malm. t. 5. *M. hisfuta*; Andr. Repof. t. 281. *Angophora cordifolia*; Cavan. Ic. v. 4. 21. t. 338.)—Leaves opposite; heart-shaped and clasping the stem at their base. Young branches, flower-stalks and calyx bristly.—Gathered near Port Jackson, New South Wales, by Dr. J. White. It was raised from seeds in England by Messrs. Lee and Kennedy about the year 1789, and is now not very unfrequent in the more curious greenhouses, flowering in July

and August. The stem is usually four or five feet high, probably much more in New Holland, rigid, branched, round, and leafy. Leaves evergreen, very rigid and coriaceous, harsh and somewhat hispid, nearly sessile, oblong, obtuse, wavy, a little revolute and slightly crenate, with one rib and many cross parallel veins; glaucous beneath: clasping the stem with their dilated heart-shaped base. The younger branches are downy and bristly, terminating in copious, umbellate or cymose, large, white flowers, whose stalks and calyx are clothed with reddish-brown, prominent, bristly hairs, like those of the beautiful *Rose Acacia*, *Robinia hispida*. This is one of the most stately plants, when in perfection, that have been procured from New Holland. Venterat has figured so miserable a specimen, that it could scarcely be recognized.

2. *M. floribunda*. Many-flowered *Metrosideros*. Sm. n. 2. Ait. n. 2.—Leaves opposite, stalked, ovato-lanceolate. Panicle cross-branched. Flower-stalks umbellate.—Native of New South Wales. Sent by Sir J. Banks, about 1788, to Kew, where it blooms in the greenhouse about July and August. A more spreading, slender and smooth shrub than the preceding, with long, lanceolate, or slightly ovate, pointed, entire leaves, resembling those of an *Eucalyptus*. The flowers are copious, white, much smaller than the former, in numerous small umbels, collected into large, lax, cross-branched, occasionally hispid, panicles. Calyx smooth, with sharp prominent teeth.

3. *M. coccata*. Angular-fruited *Metrosideros*. Gærtn. v. 1. 171. t. 34. f. 2. Sm. n. 3. (*Angophora lanceolata*; Cavan. Ic. v. 4. 22. t. 339.)—Leaves opposite, stalked, linear-lanceolate, pointed, oblique. Panicle repeatedly cross-branched. Flower-stalks imperfectly umbellate.—Native of New South Wales. Leaves narrower, longer, more rigid and shining, than the last, as well as more oblique, or falcate. Panicle more irregularly and repeatedly branched, more stout, angular, and invariably smooth, but less decidedly umbellate in its ultimate divisions. Flowers twice as large, yellowish-white, the strong angles of the calyx permanent in the obovate woody fruit.

4. *M. diffusa*. Spreading *Metrosideros*. Sm. n. 4. Willd. n. 4. (*Melaleuca diffusa*; Forst. Prod. 37. *M. lucida*; Linn. Suppl. 342.)—Leaves opposite, ovate, veiny; smooth on both sides. Panicles axillary and terminal, with opposite flower-stalks.—Gathered by Forster in New Zealand, and by Nelson in Otaheite. We are indebted to Sir J. Banks for a fine specimen from the last-named island. The stem is much branched, and by the name we presume it spreads horizontally. Leaves smooth, numerous, on shortish thick stalks, ovate or obovate, one and a half inch long, with a strong mid-rib, and a pair of very slight evanescent marginal ones; the cross veins numerous, fine and reticulated. Flowers in dense, level-topped panicles. Calyx smooth, short, hemispherical, without angles; the teeth broad and blunt. The petals, and long stamens and style, appear to us crimson; the younger Linnæus judged them, by his ill-dried specimen, to be yellow. The valves of the ripe capsule, besprinkled externally with large resinous dots, rise half their length above the calyx, and have not the obtuse or abrupt termination observable in *M. coccata*. Indeed the species before us, with the four or five following, shew many indications of a generical difference from the first three, which perhaps, if they were compared alive, might be more evident.

5. *M. villosa*. Hoary *Metrosideros*. Sm. n. 5. Willd. n. 5. (*Melaleuca villosa*; Linn. Suppl. 342, excluding the synonym. *M. æthiops*; Forst. Prod. 38. *Leptospermum collinum*; Forst. Gen. 36. n. 2.)—Leaves opposite, ovate, veiny; downy beneath. Panicles dense, axillary and terminal.

METROSIDEROS.

minal, opposite, downy. Flowers sessile, crowded.—Gathered in Otaheite by the Forsters, as well as by Mr. Archibald Menzies. The size and habit are like the last, but the fine downy hoariness of the *flower-stalks*, *calyx*, tender *branches*, and backs of the younger *leaves*, characterise the present beautiful species. The back of each little *calyx-tooth* is smooth, though the *petals* are externally hoary. The latter, like the very long *filaments* and *style*, are crimson. The *leaves* are broadish-ovate, or obovate, with a short, blunt, channelled point. Mr. Menzies informs us this was called *Metrosideros spectabilis* by the late Dr. Solander; therefore it must be Gertner's t. 34. f. 9.

6. *M. florida*. Flowery *Metrosideros*. Sm. n. 6. Willd. n. 6. (*Melaleuca florida*; Forst. Prod. 37. *Leptospermum scandens*; Forst. Gen. 36. n. 1. t. 36. f. a — d.)—Leaves opposite, elliptic-oblong or obovate, veiny, smooth. Panicle dense, terminal. Calyx turbinate, smooth.—Native of New Zealand. A fine species, smooth in every part, with long, leafy, round *branches*. *Leaves* blunt, near two inches in length. *Flowers* large and handsome, crimson, in dense obtuse terminal panicles, whose stalks are usually three-flowered. The *calyx* is remarkably elongated, swelling gradually upward, with a wide mouth and short blunt teeth. The *style* is remarkable for its great size, being, like the *filaments*, above an inch long, with a very slightly dilated *stigma*, permanent. We know nothing of the *fruit* but from Forster, who represents the seeds as small and slender, yet he appears not to have seen them ripe.

7. *M. umbellata*. Umbellate *Metrosideros*. Cavan. Ic. v. 4. 20. t. 337.—Leaves opposite, lanceolate, pointed, smooth. Flowers in terminal simple umbels. Calyx turbinate, silky, with naked teeth. Petals oblong.—Gathered in New Zealand by Mr. Menzies, who gave us a specimen by the name of *M. lucida*, of which finding no traces in authors, we adopt that of Cavanilles, who says his specimens were gathered by Lewis Née, near the town at Port Jackson, New South Wales. We have however never heard of it from thence by any other means. The *stem* is said to be eight or ten feet high. The *branches* are erect, repeatedly forked, smooth, leafy, round, or slightly angular. *Leaves* one and a half or two inches long, elliptic-lanceolate, tapering at each end, slightly revolute, on short thick stalks; the under side palest, most opaque, dotted. *Flowers* large, red, in simple very close umbels, the stalks being extremely short and thick. *Calyx* turbinate, much dilated upwards, very silky, except the teeth, which are broad, obtuse, and naked, glandular at the back. *Petals* elliptic-oblong, twice the length of the calyx-teeth. *Stamens* and *style* thrice as long as the petals.

8. *M. glomulifera*. Cluster-flowered *Metrosideros*. Sm. n. 7. Ait. n. 3.—Leaves opposite, ovate, reticulated with veins; downy beneath. Heads of flowers lateral, stalked, downy as well as the bractæas.—Gathered near Port Jackson by the late Mr. David Burton. Mr. Brown sent it in 1805 to Kew garden, where it blossoms in May and June. This species seems arboreferent. The *leaves* are ovate or oblong, greyish, with innumerable small reticulated veins; rather downy beneath. *Flowers* whitish, in globose heads. *Footstalks*, common *flower-stalk*, *calyx*, and *petals*, clothed with fine hoary down. *Stamens* and *style* reddish.

9. *M. angustifolia*. Narrow-leaved *Metrosideros*. Sm. n. 8. Ait. n. 4. (*Myrtus angustifolia*; Linn. Mant. 74, excluding the synonym of Burmann.)—Leaves opposite, linear-lanceolate, naked. Flower-stalks axillary, umbellate. Bractæas lanceolate, smooth, deciduous.—Native of the Cape of Good Hope, from whence it was sent by Mr. Masson to Kew in 1787, but has not yet flowered there. A bushy *shrub*, with

smooth, narrow, lanceolate *leaves*, two inches long, one-third of an inch broad, finely dotted on both sides. *Footstalks* short and thick. *Flowers* numerous, small, white, in opposite, axillary, stalked, compound, downy, corymbose clusters. *Calyx* hemispherical, quite smooth, at length decaying, its ribs only remaining round the nearly globular capsule. It is singular that Thunberg, who sent perfect specimens, with ripe fruit, to Linnæus, should still retain this plant as a *Myrtus* in his *Prodromus*, p. 87.

Section 2. *Leaves alternate.*

10. *M. ciliata*. Fringed *Metrosideros*. Sm. n. 9. (*Melaleuca ciliata*; Forst. Prod. 38. *Leptospermum ciliatum*; Forst. Gen. 36. n. 3. t. 36. f. r — t.)—Leaves scattered, imperfectly opposite, elliptical, obtuse, coriaceous, somewhat fringed at the base. Corymbs terminal, hairy.—Gathered by Forster in the island of New Caledonia, not in New South Wales. A low bushy *shrub*, with numerous, pale, thick and rigid, oval, concave *leaves*, like those of a *Buxus* or *Celastrus*, an inch long, more or less; the young ones fringed at the base. The short thick *footstalks* are also hairy while young. *Flowers* deep red, large and handsome, most like those of our fourth, fifth, and seventh species, a few together at the ends of the branches, on corymbose, slightly hairy stalks. *Calyx* short, broad and depressed, a little hairy, its teeth oblong, fringed. *Petals* obovate, fringed, rather longer than the calyx-teeth. *Stamens* and *style* very long. *Capsule* broad, tumid, dotted with numerous prominent resinous glands, and rising, in three rounded lobes, much above the rim of the calyx. It is greatly to be wished that this species, and such as most resemble it, could be obtained for the gardens of Europe.

11. *M. linearis*. Linear-leaved *Metrosideros*. Sm. n. 10. Ait. n. 5. (*Melaleuca linearis*; Schrad. Sert. Hannov. 19. t. 11.)—Leaves scattered, linear, channelled, acute, roughish, rigid. Flowers lateral, crowded, sessile.—Native of New South Wales. Communicated to the Kew garden by Sir J. Banks, about the year 1788. A stout and rigid *shrub*, or small *tree*, with round smooth *branches*. *Leaves* not unlike those of some kinds of Fir, in their general appearance, being very numerous, scattered, crowded, sessile, three or four inches long, scarcely more than a line broad, single-ribbed, thick-edged, entire, roughish to the touch, dark green, bluntish with a small pungent point. *Flowers* sessile, in considerable numbers round the young branches, for the space of three inches or more, spreading every way, the branch being continued and leafy beyond them. *Calyx* bell-shaped, smooth and even, with broad, triangular, convex, deciduous teeth. *Petals* orbicular, convex, green, often slightly downy. *Stamens* and *style* an inch long; prominent, of a beautiful shining crimson. *Capsules* globose, somewhat depressed, with a very thick smooth coat from the body of the calyx, often crowding each other into an angular shape. Their little convex valves scarcely rise above the even rim of the calyx.

12. *M. lanceolata*. Lanceolate *Metrosideros*. Sm. n. 11. Ait. n. 6. (*M. citrina*; Curt. Mag. t. 260. *M. lophantha*; Venten. Jard. de Cels, t. 69. *M. marginata*; Cavan. Ic. v. 4. 18. t. 332.)—Leaves alternate, lanceolate, pointed, smooth. Flowers lateral, crowded, sessile.—Native of New South Wales. Frequent in greenhouses. This first flowered in the late Marchioness of Rockingham's collection about the year 1790. It differs from the last only in foliage, the *leaves* of the present being truly lanceolate, about two inches in length, and half an inch broad, with a slender marginal rib. They are smooth on both sides, plentifully dotted. *Flowers* exactly like the last. The *calyx* is sometimes downy,

downy, but not so constantly as we originally thought. Every part when bruised is highly aromatic. In the Transactions of the Linn. Soc. v. 9. p. 17, a suspicion is mentioned that this and the foregoing, and even the following, may be merely varieties of one species. We have seen from the seeds of one single capsule of the *lanceolata*, plants produced greatly differing in the breadth of their leaves, inasmuch that we are almost persuaded of the former part of the position; but the following appears too different in other respects, to be confounded with either of those plants. We have determined to keep them all separate, for the present at least, till Mr. Brown, who has seen them wild, shall give his opinion.

13. *M. fuliginea*. Willow-leaved *Metrosideros*. Sm. n. 12. Ait. n. 7. Venten. Jard. de Cels, t. 70.—Leaves alternate, lanceolate, tapering at each end, pointed. Flowers lateral, crowded, sessile, smooth in every part.—Native of New South Wales. Sent to Kew by Sir J. Banks about the year 1788. It flowers in May and June, and differs from *M. lanceolata* in its less rigid leaves, tapering remarkably at each extremity; flowers not above half so large, with yellowish stamens, their petals not even fringed, but quite smooth in every part, as well as the calyx. To these marks the ingenious Ventenat added, that the scales of the buds are externally striated, which is not the case in the *lanceolata*. Finally, the *fuliginea* has no aromatic flavour.

14. *M. viminalis*. Wand-like *Metrosideros*. Gærtn. v. 1. 171. t. 34. f. 4. Willd. n. 13.—Leaves alternate, linear-lanceolate. Flowers lateral, crowded, sessile, downy.—Native of New Holland. Very different from the last, its leaves being more linear, and not tapering towards the extremities. The flowers are downy, and rather smaller. We have seen it in Sir J. Banks's herbarium only.

15. *M. capitata*. Round-headed Purple *Metrosideros*. Sm. n. 13. Willd. n. 14.—Leaves scattered, rough-edged, obovate, with a minute point. Heads of flowers terminal. Calyx and young branches hairy.—Found near Port Jackson, New South Wales, by Dr. J. White. We have not heard of it in any garden. It seems rather a humble, much-branched shrub; the branches often clustered, hairy when young, round and rather slender; clothed with numerous, scattered, obovate, sessile leaves, rough, or finely serrated, at the edges, from a quarter to half an inch long, with a little recurved point; their ribs three or five, not very apparent; both sides finely dotted, the edges sometimes fringed. Flowers numerous, purple, in little, round, compact terminal heads; the calyx clothed with long, soft, hoary hairs. Bractees lanceolate, fringed, deciduous. The leaves are scarcely aromatic, but rather altringent, with a slight flavour like tea.

16. *M. ericifolia*. Heath-leaved *Metrosideros*.—Leaves imbricated, linear, pointed, hairy; channelled above; convex beneath. Heads of flowers terminal. Bractees feathery. Calyx smooth.—This hitherto nondescript species was gathered by Mr. A. Menzies, near King George's sound, on the west coast of New Holland. It has the habit of an *Erica*, *Diosma*, or *Phyllica*. The stem is leafy, erect, with copious, short, leafy, lateral branches. Leaves very numerous, crowded, about a quarter of an inch long, nearly linear, blunt, with a small point, dotted, hairy, dark green, entire; convex beneath; slightly concave, or channelled, above. Heads of flowers terminal, about the size of the last. Bractees lanceolate, covered at the back with long soft hairs, deciduous. Calyx turbinate, dotted, naked. The petals appear to be purplish. The leaves have a slight astringency, with some flavour of turpentine, but by no means powerful. We have not seen the capsule.

We are well aware that the habit of the two last species, is so different from the three which immediately precede them, especially their inflorescence; and all these together are so unlike those described in the former section, that it is highly probable some good generic difference is to be found in their fructification. On this subject, as on many similar ones, we must wait for the information of Mr. Brown, who alone has compared them all in their native country.

METROVITZ, in *Geography*, a town of Dalmatia; 6 miles N. of Narenta.

METSAMAA, a town of Sweden, in the government of Abo; 38 miles N.N.E. of Björneborg.

METSCHOVSK, a town of Russia, in the government of Kaluga; 40 miles W.S.W. of Kaluga. N. lat. 54° 12'. E. long. 34° 50'.

METTESHOP, or METTENSCHOP, in our *Old Writers*, an acknowledgment paid in a certain measure of corn; or a fine or penalty imposed on tenants, for defaults in not doing their customary service in cutting the lord's corn.

METTIIAH, in *Geography*. See METTICHE.

METTINGEN, a town of Germany, in the county of Tecklenburg; 6 miles N. of Tecklenburgh.

METTINICK ISLAND, an island in the Atlantic, near the coast of Main. N. lat. 43° 51'. W. long. 68° 59'.

METTSECOUBE, a small island, or perforated rock, in the Mediterranean, on the coast of Algiers; where, it is said, Raymond Lully, in his mission to Africa, frequently retired to meditate; six miles N. of Boujeiah.

METTYCONDA, a town of Hindoostan, in Mysore; 25 miles N. of Bangalore.

METUALES, or MUTUALES, a people of Asia, dispersed in great numbers all over Syria; so called from Mutual, a celebrated captain, who destroyed the current religion of the Persians, in order to substitute Mahometanism instead of it. The Mutuales are, therefore, schismatic Mahometans. They admit the Koran as a sacred book, and Mahomet as the first of prophets; and they also venerate Jesus Christ, after the manner of the Turks. The Mutuales renounce the succession of Mahomet, except Ali, whom they acknowledge as distinguished among all the disciples of the prophet by his skill in war, and his knowledge in letters. All forms of religion are held by them in the same contempt. Extreme hunger alone can constrain them to eat with Christians.

METULÆ, a town of Sardinia; 18 miles W.N.W. of Villa d'Iglesias.

METUPETTA, a town of Hindoostan, in the Carnatic; 30 miles S.E. of Tanjore.

METWAY HARBOUR, a bay on the S. coast of Nova Scotia. N. lat. 44° 10'. W. long. 64° 30'.

METYS, a word used by many of the ancient writers to express a substance collected by bees, in order to the stopping up cracks and crevices in their hives.

The old authors mention three kinds of substances used by the bees on this occasion, the *metys*, *pissoceros*, and *propolis*. The moderns use only the latter term to express every thing of this kind: the *metys* and *pissoceros* seeming to have been only the same *propolis*, more or less mixed with wax. The substance is a resin, of a middle consistence between the hard and the fluid ones. It is usually of a reddish-brown on the surface, and yellow within, and is collected from several trees, of which the poplar seems to be the principal, and the willow the next.

METZ, plur. *Metzen*, in *Commerce*, a corn measure in Germany. At Augsburg, 8 metzen = a schaf, and the metz = 4 vierlings, 16 viertels, or 64 maessals: 100 metzen = about 81 Winchester bushels. At Vienna, 30 metzen = a muth;

muth; the metz is divided into 4 viertels = 8 achtels = 16 muhlmaffels = 32 fudarmaffels = 128 bechers, and it contains 3100 French cubic inches = 3753 English ditto; hence 4 metzen = 7 Winchester bushels; and a muth = 6½ English quarters nearly. See *Tab. XXI. of MEASURES.*

METZ, in *Geography*, a city of France, chief place of a district, and capital of the department of Moselle, situated at the conflux of the Seille and Moselle, and containing three cantons, corresponding to the three divisions of the city: the first includes 6455, and its canton 147,81 inhabitants, in 24 communes; the second contains 12,355, and its canton 14,958 inhabitants, in 11 communes; and the third part has 13,289, and its canton 15,000 inhabitants, in 4 communes. The whole extent of its territory comprehends 245 kilometres. Metz is divided into the Old and New Town: the former is large, with narrow streets; but the houses, although built in the old style, are handsome. The New Town is also large, but more beautiful than the other. Besides its fortifications, it has three citadels. Its bishop, before the revolution, assumed the title of prince of the Roman empire; he was suffragan to the archbishop of Treves, and his diocese comprehended 613 parishes, and his revenue was 120,000 livres. Exclusively of the cathedral, it contained three chapters, sixteen parish churches, six abbeys, and a college. The Jews, who are numerous in this city, have a synagogue. The country round Metz, called the Meszin, is tolerably fertile, and produces a little wheat. This was anciently a part of the kingdom of Austrasia; and Metz was its capital and the royal residence. When the children of Charles the Great and Louis the Pious divided the dominions of that crown, the kingdom of Lorraine arose out of the ruins of that of Austrasia; and about the termination of the second royal line of France, Metz, Toul, and Verdun, shook off the yoke, and put themselves, as free cities, under the protection of the emperor. In 1552, these cities placed themselves under the protection of the French, till the peace of Westphalia in 1648, when the three bishoprics were absolutely transferred to France; 30 miles S. of Luxemburg. N. lat. 49° 7'. E. long. 6° 15'.

METZERWISE, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Thionville. The place contains 607, and the canton 13,439 inhabitants, on a territory of 295 kilometres, in 45 communes.

METZONA, a town of European Turkey, in Epire; 25 miles E. of Arta.

METZU, GABRIEL, in *Biography*, one of the most ingenious painters of the Flemish school. He was born at Leyden in 1615. It is not exactly known with whom he learned the rudiments of the art, nor does it much concern us to be informed of it, as his style is entirely his own, having great completion in the finishing, with breadth and freedom quite unlike the tedious minute exactness of Gerard Dow, or still more that of Mieris.

Metzu generally painted small pictures of subjects taken from ordinary occurrences happening among the more polished class of his countrymen. A morning visit at a lady's toilette; a conversation or concert among people dressed in the best style of the time in Flanders; a gentleman stopping to drink at an inn, &c.; such are the objects which generally compose his pictures, in the execution of which one is at a loss to know whether most to admire the beauty of arrangement in the forms, the clearness and harmony of the tones, or the extreme delicacy, breadth, and truth in the execution. His works are by no means scarce in this country, and are eagerly bought at high prices.

He was severely afflicted with the stone, the effect of, and which was probably increased by, his unremitting assiduity. Having, at the age of 43, consented to undergo the operation of cutting for extraction, his constitution was found too weak to support the trial, and he did not survive it.

MEVA, or GNIEV, in *Geography*, a town of Prussia, in Pomerelia, on the Vistula; 22 miles S. of Dantzic.

MEVANGFANG, a town of Upper Siam; 115 miles N. of Porfalone.

MEVELEVITES, in *Modern History*, a sort of dervises, or religious, among the Turks, so called from Meveleva, their founder. They affect to be very patient, humble, modest, and charitable; but in reality are very debauched and dishonest.

MEVIUM, a name mentioned by Fallopius and others, as given by some medical writers to the venereal disease.

MEVIUS, DAVID, in *Biography*, a learned jurist, and privy-counsellor to the king of Sweden, was employed in various negociations by Charles XI., and drew up the regulations by which the German provinces, occupied by Sweden, were to be governed. He wrote "Commentaries on the Law of Lubec;" "Counsels or Deliberations;" and "Universal Jurisprudence."

MEULAN, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Versailles. The place contains 2100, and the canton 12,584 inhabitants, on a territory of 130 kilometres, in 20 communes.

MEULEBECHE, a town of France, in the department of the Lys, and chief place of a canton, in the district of Courtray. The place contains 6660, and the canton 12,506 inhabitants, on a territory of 90 kilometres, in four communes.

MEULEN, ANTHONY FRANCIS VANDER, in *Biography*. This painter was born at Brussels in 1634. He was a disciple of Peter Snayers, a battle painter of considerable note, and his early progress gave strong promise of his future eminence.

His ingenious pictures attracted the attention of M. Colbert, the minister of Louis XIV., who induced V. Meulen to leave Brussels, and settle in Paris; and soon afterwards introduced him to the king, who appointed him to attend and paint the scenes of his military campaigns, gave him a pension of 2000 livres, and paid him besides for his performances. He made sketches of almost all the most remarkable events that occurred in these expeditions of Louis; designing upon the spot the encampments, marches, sieges, &c. of the armies; and the huntings of the king; the assembling of the officers, &c.: from these he composed his pictures, which are skilfully arranged, with great bustle, animation, and spirit, and executed with a very agreeable, though not always a natural tone of colour, and with a sweet and delicate pencil. Some of his pictures exhibit uncommon skill and taste in composition. Frequently the scene he had to paint was flat and insipid, such as a marshy country before long extended walls; even these he contrived to render agreeable by his judicious management of the chiaro-scuro, and the pleasing groups which he displayed with his figures, which, though dressed in the stiff uncouth frippery of the French court of that period, are handled with so much delicacy and corresponding taste, that they never fail to please. He was particularly skilful in portraying the actions of the horse, of which he has left behind him a number of excellent studies, drawn with great care from nature. His pictures frequently include a great extent of country, and an immense number of objects. His perfect knowledge of perspective enabled him to manage

manage the objects and distances with the greatest ease and effect, so that the eye accompanies the figures without confusion, and alligns to each its due action and distance. He lived not beyond the age of 56, but left a great number of pictures, most of which are in France, but they are not very unfrequent in this country.

MEUM, in *Botany*, supposed to be the *μῦμος* of Dioscorides, which is so far correct only as they are both of the umbelliferous order; for the plant described by that ancient author, is said to be sometimes two cubits high; our's is scarcely about a foot. See *LIGUSTICUM*, species twelve; for *Oribasius* read *Aethusa*.

MEUN, or MEUNG, JOHN DE, in *Biography*, an old French poet, was born at Meun, on the river Loire, in the year 1280. He was well acquainted with the studies of the age, but poetry was his favourite pursuit, and having a turn for satire and lampoon, he occasionally offended those who were disposed to be friendly towards him. Some court ladies, smarting under his lash, once seized him, with the resolution of taking their revenge, but he escaped the threatened punishment, by desiring the most unequal to inflict the first blow. He died about the year 1364. By his last will, he directed that his body should be interred in the church of the Dominicans at Paris, bequeathing to them, in the way of recompence, a heavy chest, which was not to be opened till after the funeral. The contents proved to be of no value whatever, which so enraged the holy fathers, that they ordered the dead body to be disinterred: this coming to the knowledge of the parliament, an order was issued to insist upon their giving it an honourable burial in their cloister. The principal work of this author was the continuation of the "Roman de la Rose," begun by William de Lorris. De Meun's addition constitutes more than three-fourths of the whole; it is less poetical than the first part, but has more of satire and real manners. An edition of this poem was published by Du Fresnoy, in three vols. 12mo. to which other pieces are added. Moreri.

MEUN, in *Geography*, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Orleans; 10 miles S.W. of Orleans. The place contains 4418, and the canton 9525 inhabitants, on a territory of 207½ kilometres, in 8 communes.

MEURJE, a town of Egypt, on the right bank of the Nile; 23 miles S. of Achmim.

MEURS, or MORS, late a principality of Germany, surrounded by the duchies of Juliers, Cleves, and Berg, the archbishopric of Cologne, and the duchy of Gueldres; about eight miles long, and as many broad. It abounds with corn, cattle, and deer. To the E. its limits are formed by the Rhine, and it is watered by several smaller rivers and brooks. This principality is now annexed to France, and included in the department of the Roer.

MEURS, a town of France, in the department of the Roer, and chief place of a canton, in the district of Creeldt; formerly capital of the above-mentioned principality. The town is small but fortified. It has a Calvinistic church and a Latin school. The place contains 2111, and the canton 9144 inhabitants, in 15 communes; 13 miles S.E. of Gueldres. N. lat. 51° 13'. E. long. 6° 30'.

MEURSIUS, JOHN, in *Biography*, was born at Lofden, near the Hague, in the year 1579. He was an early proficient in classical literature, and composed Latin orations and Greek verses with facility before he was thirteen years of age. He received his academical learning at Leyden, and engaged in the education of Barneveldt's sons; whom he afterwards accompanied on their travels. He

spent some time in the study of the law at Orleans, and in 1608 was made doctor of that faculty. He visited several courts of Europe, formed an acquaintance with many learned foreigners, and examined the most celebrated libraries. On his return to Holland he was appointed to the professorship of history at Leyden in 1610, and next of the Greek language; and in the following year the states of Holland nominated him their historiographer. The wretched fate of Barneveldt involved the happiness of his friend and adherent Meursius, and though his attention to the duties of his office had given his enemies no pretext for depriving him of his situation; yet they found means to render his situation to uneasy, that he only waited for an occasion to quit it with honour. This at length arrived, when, in 1625, he received an invitation from Christian IV., king of Denmark, to occupy the professorship of history and politics in his new university of Sora, together with the post of royal historiographer. These offices he readily accepted, and removed to Denmark, where he continued to support his high reputation, and obtained the esteem of his sovereign and the court. He died at Sora in the year 1639, leaving behind him a high character for profound learning, to which his various works bear ample testimony. His chief publications related to the language and antiquities of Greece, viz. "De Populis Atticis;" "Atticarum Lectio, lib. iv.;" "Archontes Athenienses;" "Fortuna Attica;" "Athenæ Atticæ;" "De Fekis Græcorum;" all which have been admitted into the collections of Grævius and Gronovius. The writings of Meursius were published collectively in twelve volumes folio, 1741. Moreri.

This learned laborious critic and antiquary, was the first who published the Greek text of the three books of Aristoxenus upon music, followed by the Greek treatises of Nichomachus and Alypius, with notes by the editor; which Meibomius has censured, as he has those of Gogavivus, Kircher, and all those who preceded him in commenting, translating, or even mentioning any of the seven Greek writers upon music that are come down to us, and which he has translated into Latin, and been seemingly more successful in translating and explaining than any other critic or commentator who has had the courage to undertake so difficult a task.

Meursius's edition of Aristoxenus, Nichomachus, and Alypius, was published at Leyden, 1616, 4to. See Fabricius *Bibl. Græca*.

MEURTE, in *Geography*, a river of France, which rises near St. Diey, in the department of the Vosges, and joins the Moselle, 5 miles below Nancy.

MEURTE, or *Meurthe*, one of the ten departments of the N.E. region of France, formerly Tulois, and the S. part of Lorraine, bounded on the N. by the department of the Moselle, on the E. by that of the Lower Rhine, on the S. by that of the Vosges, and on the W. by that of the Meuse, in 48° 40' N. lat. Its length is 26 French leagues, and breadth 16, and its extent in kilometres is 6430, or 310 square leagues; and the number of its inhabitants is 342,107, or, according to Hassenfrazt, 351,161; it is divided into 5 circles, and 29 cantons, and 718 communes, or, according to Hassenfrazt, 9 circles, and 74 cantons: the five circles are as follow, viz. Toul, including 59,689 inhabitants; Nancy, 88,384; Chateau-Salins, 50,554; Sarrebourg, 56,091; and Luneville, 87,389: its capital is Nancy. The contributions of this department, in the 11th year of the French era, were 2,681,581 fr.; and its expences charged for administration, justice, and public instruction, 348,829 fr. 33 cents. The soil of the plains is fertile in grain, wine, fruits, &c.;

&c.; and that of the hills is covered with wood and pastures. Here are iron mines, quarries of marble and stone, mineral springs, &c.

MEVSAK, a town of Arabia, in the province of Hedsjas; 60 miles N.E. of Vadilkova.

MEUSE, a river of France, which rises at a village called Meuse, in the department of the Upper Marne, and after being joined by various other rivers in its course, it divides into two streams, the upper one towards the N. taking the name of Merwe, which it preserves, as well as that of Meuse, till it joins the German ocean, after passing the islands of Holland and Zealand.

MEUSE, one of the ten departments of the N.E. region of France, composed of Verdunois and Barrois; bounded on the N. by the duchy of Luxemburg, on the E. by the departments of the Moselle and the Meurte, on the S. by those of the Marne and Vosges, and on the W. by those of the Marne and the Ardennes, in N. lat. 49° ; 33 Fr. leagues long, and 16 broad, in territorial extent 6275 kilometres, or 318 square leagues; the number of its inhabitants is 275,898, or, according to Hassenfratz, 268,108; it is divided into 4 circles, 28 cantons, and 591 communes; or, according to Hassenfratz, into 8 circles and 79 cantons; its four circles are Bar-sur-Ornain, containing 74,168 inhabitants; Commercy, 73,103; Montmedy, 59,572; and Verdun, 69,055. Its capital is Bar-sur-Ornain. Its contributions in the eleventh year of the French era were 2,424,922 fr., and its expences amounted to 231,113 fr. 66 cents. This department is diversified with hills and plains, yielding fruits, grain, and pastures. It has mines of iron and other metals.

MEUSE, *Lower*, one of the thirteen departments of the region of France, called the Reunited country, formed of a part of Gueldres, and of the territories of Liege, Maestricht, and Venloo; bounded on the N. by Brabant, on the E. by the department of the Roer, on the S. by that of the Ourthe, and on the W. by that of the Dyle, and that of the Two Nethes, in N. lat. $50^{\circ} 50'$: its territory comprehends $3622\frac{1}{2}$ kilometres, or 190 square leagues, and it contains 232,662 inhabitants; or, according to Hassenfratz, 216,566. It is divided into three circles, 23 cantons, and 310 communes; or, according to Hassenfratz, three circles and 30 cantons: the circles are Maestricht, including 107,410 inhabitants; Hasselt, 60,399; and Ruremond, 64,853. Its capital is Maestricht. Its contributions in the year eleven were 1,600,995 fr., and its expences 205,543 fr. 33 cents. This department is partially fertile, and yields grain, fruits, and good pastures.

MEUTANG, in *Botany*, the name of a flower much esteemed by the Chinese, which, on that account, they call the king of flowers. It is larger than our rose, and imitates its figure, only its leaves are more expanded. As its smell comes short of that of the rose, so in beauty the rose is outdone by it. It has no prickles, and its colour is a mixture of white with purple, but so as to incline most to white; yet sometimes there are found reddish and yellow ones. The tree it grows on is not unlike our alder-tree, and is cultivated throughout that large empire with great care, being covered in the summer time with a shade to defend it from the scorching heat of the sun.

MEW ISLAND, in *Geography*, a small island in the East India sea, near the W. coast of Java; three miles N.E. of Java Head.

Mew *Islands*, a cluster of small islands on the coast of Honduras, S. of Cape Camaron.

Mew *Stone*, a small island, or round elevated rock, in

the Southern India ocean, near the coast of Van Diemen's land. S. lat. $43^{\circ} 46'$. E. long. $146^{\circ} 24'$.—Alfo, a large rock in the English channel, on the S. coast of Devonshire, E. of the entrance into Plymouth sound; four miles S. of Plymouth. N. lat. $50^{\circ} 18'$. W. long. $3^{\circ} 59'$.

MEWAT, a hilly and woody tract of Hindoostan, lying on the S.W. of Delhi, and on the W. of Agra; confining the low country along the western side of the Jumnah river, to a (comparatively) narrow slip, and extending westwards about 130 British miles. Its length from N. to S. is about 90 miles. This tract, although situated in the heart of the empire of Hindoostan, that is, within twenty-five miles of its former capital, Delhi, is inhabited by people, who have ever been characterized as the most savage and brutal, and whose chief employment is robbery and plundering. In 1265, 100,000 of these wretches were put to the sword; and a line of forts was constructed along the foot of their hills. At the present time, says major Rennell, Mewat is so notorious a nursery for thieves and robbers, that parties of "Mewatti" are taken into pay by the chiefs of Upper Hindoostan, for the purpose of distressing the countries which are made the seat of warfare. In Acbar's division, this tract made a part of the soubahs of Delhi and Agra; but most of it was included in the latter. Mewat contains some strong fortresses, on steep or inaccessible hills; among which is Alwar, or Alvar, the citadel of Macherry Rajah. It has very often changed masters, during the contests between its native rajahs (or kanzadeh), and the Jats, the rajah of Joinagur, Nudjuff Cawn, and Madajee Sindia; and between these powers successively. Sindia has made a considerable progress in the reduction of it.

MEWING, a disorder incident to all kinds of birds; being the casting of their feathers.

MEXIA, PEDRO, in *Biography*, chronicler to Charles V. is one of the few Spanish writers whose works have found their way into our language. He wrote a history of the Cæsars, which includes the German emperors, and is one of the translators of Edward Grimeston: he was author also of "Silva de varia Leccion," with the additions of its Italian and French translators in that "Treasury of ancient and modern Times," which is referred to by Grose, and of which the two parts having been published separately, are not easily to be met with together. Mexia was also the author of certain colloquies to the praise of the afs, in imitation of Lucian and Apuleius, and a history of Charles V. which he left unfinished, and which has never been edited. He was born at Seville, and died in or about the year 1552. Gen. Biog.

MEXICANÓ, or A DAYES, a river of Louisiana, which, after pursuing a S.E. course, discharges itself into the gulf of Mexico, at Cabo du Nord, W. by S. of Ascension bay, and E. by N. of Trinity river. On its banks are rich silver mines.

MEXICO, one of the seven territories, or domains, into which the Spanish dominions in North America have been divided, sometimes improperly called *New Spain*; which is bounded on the N.W. by New Mexico, on the E. by the gulf of Mexico, on the S.E. by the isthmus of Darien, and on the S. and W. by the Pacific ocean. And though Mexico, called Old Mexico by way of distinction from New Mexico, is only a province or kingdom of New Spain, applied in its utmost extent, it is not restricted to the ancient kingdom, which extended from near the lake of Chapala in the north, to Chiapa on the river Tabasco, in the south, but includes many extensive provinces to the north. The provinces which the domain of Mexico comprehends,

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are Tabasco, Oaxaca or Guaxaca, Tlascala, Mexico Proper, Zacatula, Mechoacan, Panuco, New Galicia or Xalisco, and Nayarit; see each respectively. Accordingly, the vice-royalty of New Spain comprehended several provinces, which were not subject to the dominion of the Mexicans. The countries of Chualco and Sonora, that stretch along the side of the Vermilion sea, or gulf of California, as well as the immense kingdoms of New Navarre and New Mexico, which bend towards the W. and N., did not acknowledge the sovereignty of Montezuma, or his predecessors. These regions, not inferior in extent to the whole Mexican empire, have been reduced, some of them to a greater, others to a less degree of subjection, to the Spanish yoke. They extended through the most delightful parts of the temperate zone; their soil is, in general, remarkably fertile; and all their productions, whether animal or vegetable, are most perfect in their kind. They have all a communication, either with the Pacific ocean or with the gulf of Mexico, and are watered by rivers which not only enrich them, but may become subservient to commerce. The peninsula of California, on the other side of the Vermilion sea, discovered by Cortes in the year 1536, seems to have been less known to the ancient Mexicans than the provinces which we have just mentioned. On the E. of Mexico, Yucatan and Honduras are comprehended in the government of New Spain, though anciently they can hardly be said to have formed a part of the Mexican empire. Still further E. than Honduras lie the two provinces of Costa Rica and Veragua, which likewise belong to the vice-royalty of New Spain, but both have been so much neglected by the Spaniards, and are of so little value, that they merit no particular attention. Without attempting to ascertain precisely the limits of the ancient Mexican empire, which have been much controverted, we shall give a brief geographical, historical, and statistical account of this empire, aided by the information which we derive from Clavigero, the abbé Raynal, Dr. Robertson, Estalla, &c. The name of "Anahuac," signifying near the water, originally given to the vale of Mexico only, from the circumstance of its principal cities being situated on small islands, and on the borders of two lakes, was afterwards used to denominate the whole territory, now known under the appellation of New Spain. This extensive country was then divided into the kingdoms of Mexico, Acolhuacan, Tlacopan, and Michuacan; into the republics Tlaxcallan or Tlascala, Cholollan, and Huexotzinco, and several other distinct states. Those who wish to know the exact situation of these several countries may consult the tedious detail of Clavigero. The kingdom of Mexico, although the most modern, was much more extensive than all the other kingdoms and republics above-mentioned taken collectively. It extended towards the S.W. and S., as far as the Pacific ocean; towards the S.E. as far as the vicinity of Quauhquemallan; towards the E., exclusive of the districts of the republics, and a small part of the kingdom of Acolhuacan, as far as the gulf of Mexico; towards the N., to the country of the Huastecas; towards the N.W. it bordered on the barbarous Chichémicas, and the dominions of Tlacopan, on the western border of the lake of Tezucuo, and Michuacan, the most westerly kingdom of all, were its boundaries towards the west. The whole of the Mexican kingdom, says Clavigero, was comprehended between the fourteenth and twenty-first degrees of N. lat., and between 271 and 283 degrees of longitude taken from the meridian of the island of Ferro. The finest district of this country, with regard to situation, as well as population, was the vale of Mexico, crowned by beautiful and verdant mountains, whose circumference, measured at their base, exceeded 120 miles. A great part of the vale is

occupied by two lakes, the upper one of sweet water, the lower one brackish, communicating by a canal, and in circumference not less than 90 miles. Besides Mexico, Acolhuacan, and Tlacopan, there were, says Clavigero, 40 eminent cities in this delightful vale, and innumerable villages and hamlets. The principal inland provinces to the N. were the Otomias; to the S.W., the Matlatzincas and the Cuhtatecas; to the S. the Tlahuicas, and the Colhuicas; to the S.E. were the provinces of the Mixtecas, the Zapotecas, and the Chiaponecas. Towards the E. were the provinces of Tepryaca, the Papolocas, and the Totonacas. The maritime provinces of the Mexican gulf were those of Coatzacoalco, and Cuatlachtlan, called by the Spaniards Cotalla. The provinces on the Pacific ocean were those of Coliman, Zacatollan, Tototepec, Tecuantepec, and Xoconochco. The whole country of Anahuac was, generally speaking, well peopled. The land is, in great part, mountainous, covered with thick woods, and watered by large rivers, some of which run into the gulf of Mexico, and others into the Pacific ocean. Here are several lakes which not only embellish the country, but afford convenience to commerce. The climate of the countries of Anahuac varies according to their situation. The maritime countries are hot, and for the most part moist and unhealthy. The high lands, and especially those that are near to elevated mountains covered with snow, are cold. In the other inland countries, the temperature is such, that the inhabitants feel neither the rigour of winter nor the heats of summer. However, the agreeableness of the climate is counterbalanced by thunder-storms, which are frequent in summer, and also by earthquakes. Some of the mountains are volcanic, and occasionally emit fire. The mountains of Anahuac abound in ores of every kind of metal, and a variety of other fossils. Different parts of the country also furnish precious stones; and also several kinds of stone, valuable in architecture, sculpture, and the arts. The vegetable kingdom is no less productive than the mineral. Hernandez, in his "Natural History," describes about 1200 plants, natives of this country; some esteemed for their flowers, some for their fruit, some for their leaves, some for their roots, some for their trunk or wood, and others for their gum, resin, oil, or juice. The country yields, by culture, the cocoa-tree, the plantain, the citron, orange, and lemon: the fruits are numerous and various, but it is needless to recount them all: we shall content ourselves with specifying the cocoa-nuts, vanilla, Chili or great pepper, cotton, and achiote or rocou. The country also produces wheat, barley, rice, peas, beans, lentils, and other leguminous vegetables. Mexico is particularly distinguished by the excellence, variety, and plenty of its timber. Hernandez describes about one hundred species of trees. It also affords various sorts of plants, that yield profitable resins, gums, oils, and juices. The quadrupeds are horses, asses, bulls, sheep, goats, hogs, dogs, and cats, which have all successfully multiplied, though, as some approved writers say, not without degenerating. The ancient quadrupeds common to Mexico and the old continent, are lions, tigers, wild cats, bears, wolves, foxes, stags both common and white, bucks, wild goats, badgers, polecats, weazels, martins, squirrels, rabbits, hares, otters, and rats. There are other quadrupeds common to Mexico and other regions of the new world, which we shall not enumerate. The quadrupeds peculiarly belonging to Anahuac are the cojotl, resembling, in various respects, the adive or chacal; the tlacojotl, about the size of a dog, and the largest quadruped of those who live under the earth; three species of quadrupeds similar to dogs; an animal belonging to the genus of wild cats, called ocochtli; the cajopollin, of the

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size of a common mouse; the tozan, about the bulk of an European mole, but otherwise very different; the ahuitzotl, an amphibious animal; and the hedge-hog, or porcupine of Mexico. As for birds, their number, variety, and many valuable qualities have occasioned some authors to observe, that as Africa is the country for beasts, so Mexico is the country of birds. We cannot be detained in specifying particulars. The reptiles of Mexico may be referred to the four classes of four-footed, and of apodes, or those without feet. In the lake of Chalco there are three very numerous species of frogs, of three very different sizes and colours, and very common at the tables in the capital. The serpents are very various both in size and colour, some poisonous and others harmless. The rivers, lakes, and seas of Anahuac abound with an innumerable variety of fishes. The Mexican insects, flying, terrestrial, and aquatic, are very numerous. Scolopendras, scorpions, spiders, and ants are very common. The cochineal furnishes a very considerable article of culture and of commerce.

As to the persons and manners of the natives we may observe, that they are generally somewhat above the middle size, and well-proportioned in all their limbs: they have good complexions, narrow foreheads, black eyes, firm, regular, white teeth, thick, black, coarse, glossy hair, thin beards, and generally no hair upon their legs, thighs, and arms: their skin is of an olive colour. Few deformed persons are seen; and though they cannot be called beautiful, they do not verge to the other extreme. The young women are many of them fair and beautiful, and modest and engaging in their manners. The constitutions of these people are robust and their health sound. Some of them attain to the age of one hundred years. Although in eating they are moderate, their passion for strong liquors is indulged to excess. The state of civilization among the Mexicans, when they were first known to the Spaniards, which was much superior to that of the Spaniards themselves when they were first known to the Phœnicians, that of the Gauls when first known to the Greeks, or that of the Germans and Britons when first known to the Romans, are spoken of in terms of high commendation by Clavigero. He says, we have known among the Mexicans some good mathematicians, excellent architects, and learned divines. Of their disposition and general conduct he seems disposed to judge very favourably. He concludes with observing, that the character of the Mexicans, like that of every other nation, is a mixture of good and bad: but the bad may be easily corrected by a proper education. The ancient Mexicans, he adds, manifested more fire, and were more sensible to the impressions of honour: they were more intrepid, more nimble, more active, more industrious than those of modern times; but they were, at the same time, more superstitious and cruel. Authors, however, have differed much in their opinion with respect to the talents, cultivation, and character of the ancient Mexicans. Whilst they have been extravagantly extolled by some, they have been unduly depreciated by others. Dr. Robertson has endeavoured to steer a mean course in his description of these people; neither extravagantly commending them with Clavigero, nor sinking them below their proper level with De Paw and others. After their subjection to the Spanish crown, those who first became acquainted with them were not competent judges of their talents and characters. The rapacious adventurers who formed the train of Cortes, their conqueror, were incapable of judging or pronouncing justly concerning either their mental or moral endowments. But before we form any estimate of the degree in which they had cultivated their minds, or made any

attainments in the sciences and arts, we must advert to their origin and the early history of their establishment in Mexico. The persons who first peopled this country, as Clavigero supposes, came from the more northern parts of America, where their ancestors had been settled for many ages. The Toltecas, according to the account given us by Clavigero, are the oldest natives of whom we have any knowledge, and that is very imperfect. It has been an opinion adopted by several writers, among whom we particularize Siguenza, bishop Huet, &c. that the Mexicans, and other nations of Anahuac, were the descendants of Naphtahim, son of Mizraim, and nephew of Ham. These, it is said, having left Egypt not long after the confusion of tongues, travelled towards America. The reasons on which this opinion is grounded, are the conformity of these American nations with the Egyptians in the construction of pyramidal edifices, of the use of hieroglyphics in the mode of computing time, in their dress, and in some of their customs, and also the resemblance of the word "Teul" of the Mexicans to the "Theuth" of the Egyptians. Clavigero has examined the validity of these arguments, and suggested several objections to which they are liable. He seems to be of opinion, that the ancestors of the nations which peopled the country of Anahuac might pass from the northern countries of Europe into the northern parts of America, or rather from the most eastern parts of Asia to the most westerly part of America. This opinion is supported by the general tradition of those nations, which asserts that their ancestors came into Anahuac from the countries of the N. and N.W.; by the remains of many ancient edifices built by these people in their migrations, as well as the common belief of the people in the north; and also, by some ancient paintings of the Toltecas, which represented the migration of their ancestors through Asia and the northern countries of America. This opinion, with regard to the first peopling of America, has derived confirmation from some modern discoveries, which have ascertained the near approach of the most easterly coast of America to the most easterly part of Asia; so that if they were not, in some remote age, contiguous, a passage from the one coast to the other might be easily effected. The quadrupeds and reptiles of the new world, it is said, passed thither by land; and this opinion is founded on the presumption that the two continents were formerly united, which is adopted by Acolta, Grotius, Buffon, and other persons of established reputation. Clavigero conjectures, that there was formerly a great tract of land which united the now most eastern part of Brazil to the most western part of Africa; and that this whole space of land may have been sunk by some violent earthquakes, leaving only some traces of it in the isles of Cape de Verd, Fernando de Norona, Ascension, St. Matthew, and others, as well as many sand banks discovered by different navigators. However this be, the Toltecas being banished, as they tell us, from their own country Huehuetapallan, supposed to be in the kingdom of Tollan, from which they derived their name, and situated to the N.W. of Mexico, they began their journey in the year 1 "Tecpatl," that is 596 of our era. In every place to which they came, they remained no longer than they liked it, or could be accommodated with provisions; if they determined to make a longer stay, they erected houses, and sowed the land with corn, cotton, and other plants, the seeds of which they carried with them for the supply of their wants. In this migrating manner they travelled southward for 104 years, till they arrived at a place which they called "Tollantzinco," about 50 miles E. of the spot, where, some centuries after, was founded the famous city of Mexico. In this country, however, they did

not choose to settle, although the climate was mild and the soil fruitful; but in about twenty years after, they removed about 40 miles to the W. where, along the banks of a river, they founded the city of Tollan, or Tula, after the name of their native country. That city, supposed to be the oldest in Anahuac, and one of the most celebrated in the history of Mexico, was the capital of the Toltecian kingdom, and the court of their kings. This monarchy began, as it is said, in the year 8, "Acatl," that is, 607 of the Christian era, and lasted 384 years. The Toltecas were the most celebrated people of Anahuac for their superior civilization, and skill in the arts; whence it has been common in after ages to distinguish the most remarkable artists in an honourable manner, by the appellation of Toltecas. They always lived in society, collected into cities, under the government of kings and regular laws. They were not very warlike, and less turned to the exercise of arms than to the cultivation of the arts. The nations that have succeeded them have acknowledged themselves indebted to the Toltecas for their knowledge of the culture of grain, cotton, pepper, and other most useful fruits. Besides the arts which are dictated by necessity, they practised those which administer to luxury. They had the art of casting gold and silver, and melting them to whatever form they pleased, and acquired great reputation for the cutting of all kinds of gems; but nothing raised their character so high as their having been the inventors, or at least the reformers of that system for the arrangement of time, which was adopted by all the civilized nations of Anahuac. It is said, that observing in their own country, how the solar year exceeded the civil one by which they reckoned, about six hours, they regulated it by interposing the intercalary day once in four years, which they did more than 100 years before the Christian era. Their religion, indeed, was idolatrous, and they appear, by their history, to have been the inventors of the greatest part of the mythology of the Mexicans. During the four centuries of the monarchy of the Toltecas, they multiplied exceedingly, extending their population every way in numerous and large cities, but their circumstances changed, when in the first year of the reign of Topiltzin, they suffered for want of rain and the productions of the soil, and a great part of the nation died by famine and sickness. Topiltzin died in the second year "Tecpatl," *i. e.* 1052 of the vulgar era, and with him the Toltecian monarchy terminated. The wretched remains of the nation fought new abodes; some removed to Yucatan, some to Guatemala, and some remained in the kingdom of Tula, and dispersed themselves in the vale where Mexico was afterwards founded. After the destruction of the Toltecas, for the space of one century, the land of Anahuac remained solitary and almost entirely depopulated, until the arrival of the Chachemecas. These came originally from the northern countries. Their native country was called, according to their account, "Amquemecan," where, as they say, different monarchs ruled their nation for many years. In the character of these people a certain degree of civilization was blended with many traits of barbarity. They had distinctions between the nobility and commonalty, and the plebeians were accustomed to reverence those whose birth, merit, or favour with the prince raised them above the other ranks. They dwelt together in communities in places composed, as it is probable, of poor huts; but they neither practised agriculture, nor those arts which accompany civil life. They lived on game, and fruits, and roots, which the earth spontaneously produced. Their clothing was the skins of beasts, and their arms, the bow and arrow. Their religion consisted of the simple worship of the sun, to

which pretended divinity they offered herbs and flowers which they found springing in the fields. One of their princes was sent by Xolotl, his father, to survey the country; and at length Xolotl determined to establish himself in Tenayuca, a place six miles distant from the site of Mexico towards the N., and distributed his people among the neighbouring lands. In process of time he became acquainted with several Toltecian families, encouraged inter-marriages and alliances with them, and from them acquired the arts of agriculture, the manner of digging metals, the art of casting them, and also of cutting stones, spinning and weaving cotton, and of other things, which contributed to improve their means of subsistence, their clothing, their habitations, and their manners. Xolotl obtained from time to time an accession of new settlers; among whom were some of distinguished rank and character; and particularly three princes, to two of whom he gave his two daughters in marriage. When this ceremony had taken place, he divided his kingdom into several distinct states, and assigned the possession of them to his sons-in-law, and the other nobles of each nation. The population daily increased, and with it the civilization of the people; but ambition began to produce injurious effects, and Xolotl, who had hitherto governed with mildness, was obliged to recur to the punishment of some rebels with death. Upon the decease of Xolotl, he was succeeded by his son Nopaltzin II.; and upon his death his son, Tlotzin III. ascended the throne; and the succession continued in his family; according to the following list of Chachemecan kings.

Xolotl began to reign in the	12th century.
Nopaltzin - - -	13th
Tlotzin - - -	14th
Quinatzin - - -	14th
Techotlalla - - -	14th
Ixtlilochitl in the year	1406
Nezahualcoyotl - - -	1426
Nezahualpolli - - -	1470
Caematzin - - -	1516
Cuicuitzatzin - - -	1520
Coanacotzin - - -	1520

Such is the succession of Chachemecan kings, till their monarchy terminated. The Otomies are said to have been one of the most numerous nations which settled in the country of Anahuac; they were a rude and barbarous people, and in the time of the Mexican kings they were treated as slaves. Anciently they were renowned for their dexterity in the chase; at present they traffic in coarse cloths for the dress of the other Indians. The Tarascas, who occupied the extensive, rich, and pleasant country of Michuacan, settled many cities and villages; and their kings were rivals of the Mexicans, and had frequent wars with them. These were idolatrous, but less cruel in their worship than the Mexicans. Their language is copious, sweet, and sonorous. Besides other nations, which settled in and near the vale of Mexico, the most renowned and the most signalized in the history of Mexico, were those vulgarly called the Nahuatlacas. They consisted of seven tribes, who settled in Anahuac after the Chachemecas. The Aztecas, or Mexicans, were the last people who settled in Anahuac. Till about the year 1160 of the vulgar era, they lived in Aztlan, a country situated to the N. of the gulf of California. They left their country, as it has been said, at the instigation of a person of great authority among them, to whose opinion they all paid great deference. He was led to this resolution by the fanciful interpretation of the chirping of a bird; but whatever was the motive of the migration of the Aztecas, they left their country at the time above-mentioned. After various delays

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in the course of their peregrination, they at length arrived to the borders of the lake of Tezeuco, and near the site of Mexico. Here they suffered various persecutions and distresses; they engaged in a conflict with some enemies, whom they vanquished, and, returning to the place of their residence, they erected an altar to their tutelary god. When they fixed upon the spot, on which they determined to erect their city, they built a temple to their god, and consecrated it by the effusion of human blood. Around the sanctuary of their god they constructed wretched huts of reeds and rushes, being at that time destitute of other materials; and they called it Mexico, which denomination, being taken from the name of its tutelary god, signifies place of Mexitli, or Huitzilopochtli, as he had both these names. There are other etymologies of this name. (See MEXICO.) The foundation of this city was laid in the year 2, Calli, corresponding with the year 1325 of the vulgar era. Until the year 1352, the Mexican government was aristocratical; the whole nation paying obedience to a certain body, composed of persons the most respectable for their nobility and wisdom; but at this time they imitated the example of their neighbours, and for greater security from their enemies, formed their little state into a monarchy; and the election fell, by common consent, on Acamapitzin, who was one of the most famous and prudent persons then living amongst them. This monarch governed the city, which comprehended at that time the whole of his kingdom, in peace for thirty-seven years. In his time the population increased, buildings of stone were constructed, and those canals, which served as well for the ornament of the city as for the convenience of its inhabitants, were begun. At his death the monarchy, which was elective, was transferred to his son, Huitziluhuitl. After a reign of twenty years, he was succeeded by his brother Chimalpopoca, whose premature death made way for the election of Itzcoatl, brother to the two preceding kings, and natural son of Acamapitzin by a slave. His government was conducted with prudence; he subdued many neighbouring provinces; and he erected two temples, one to the goddess Cihuacoatl, and some time afterwards another to Huitzilopochtli, the chief Mexican divinity. After a prosperous reign of thirteen years, he was succeeded by one of his grandsons, Montezuma, who was elected with general applause, not less on account of his personal virtues, than the important services which he had performed for his country. As soon as he was fixed on the throne, he erected a famous temple in that part of the city which was called Huitznabuac; and in rearing this magnificent structure, he was assisted with materials and workmen by the neighbouring kings, with whom he was in alliance. He then prosecuted the conquests which he had commenced in the time of his predecessor, and added to the Mexican empire several districts and villages. In the tenth year of his reign, corresponding to the year 1446 of the vulgar era, the city of Mexico was much damaged by an inundation from the adjacent lake; and, in order to prevent a similar calamity, he caused to be constructed a large dyke, nine miles in length, and eleven cubits in breadth, composed of two parallel palisades, the space between which was entirely filled up with stone and mud. The inundation was soon followed by a famine, which was owing to a failure of the harvest of maize. When the city had recovered itself from the effects of this calamity, Montezuma renewed his conquests, and, after a distinguished reign of twenty-nine years, the throne was vacated by his death in 1464, and Axayacatl was chosen to succeed him. This king, having obtained a signal victory over the inhabitants of a neighbouring province, in 1468, undertook the building of a temple, which he called

Coatlan. The progress of his conquests was interrupted by his death, in the 13th year of his reign, A. D. 1477. Tizoc, his elder brother and general of the army, was elected for his successor; but his reign was short and undistinguished by any considerable military exploits. In the 5th year of his sovereignty he was poisoned by some of his feudatory subjects, A. D. 1482. During his time, the power and wealth of the crown had arrived to such a height, that he undertook to construct a temple to the tutelary god of the nation, which was to have surpassed in magnificence all the temples of that country; he had prepared a vast quantity of materials for this purpose, and had actually begun the structure, when death interrupted his projects. Ahuitzotl, the brother of the two preceding kings, a general of the army, was chosen to succeed him. The first object to which his attention was directed was the completion of the temple, which had been designed and begun by his predecessor. This work was diligently prosecuted for four years; and on occasion of his consecration he is said to have sacrificed, as some say, 72,344, and, according to others, 64,060 prisoners. This event happened in 1486. In the year 1498, this king projected to supply the lake with water from a fountain at some distance; and in spite of remonstrances from those who dreaded an inundation, he persisted in the execution of his plan. The apprehended event occurred, and the city was deluged with the overflowing water. This deluge was succeeded by a famine. The last years of Ahuitzotl were passed in constant wars; till at length, in the year 1502, after a reign of about twenty years, he died. At the time of his death, the Mexicans were in possession of all which they had at the arrival of the Spaniards. He was celebrated among his countrymen for magnificence and liberality. Having discovered in the vale of Mexico a quarry of stones, called tetzoutli, he embellished the city with so many new and magnificent buildings, that it was already become the first city of the new world. Upon the death of Ahuitzotl, Montezuma was elected as the 9th sovereign of Mexico. Besides the valour which he had displayed in several battles, as general, he was likewise a priest, and much venerated for his gravity, circumspection, and religion. In order to obtain victims to be sacrificed at his coronation, he entered into a war with some neighbouring revolters; and the ceremonies exhibited on this occasion were singularly splendid and magnificent. Notwithstanding a solemn agreement concerted between the nobility and plebeians in a former reign for chusing the offices of state, Montezuma displaced the latter, and required that all the servants of his palace should be persons of rank. These were very numerous, and very servile and obsequious. The women who attended him were also persons of rank, and they lived immured in a kind of seraglio, where their conduct was vigilantly regarded; but of these the king retained those who pleased him, and disposed of the others as a recompence for the service of his vassals. The forms and ceremonies introduced at court were additional indications of the despotism of Montezuma. The grandeur and magnificence of his palaces, houses of pleasure, woods, and gardens, corresponded to every other circumstance that served to display the splendour of his royal dignity. In Mexico, besides the seraglio for his wives, there was lodging for all his ministers and counsellors, and all the officers of his household and court, and accommodation for all foreign lords and kings who arrived hither for business or pleasure. He had two houses in the city appropriated to animals, one for birds that did not live by prey, and another for those of prey, quadrupeds, and reptiles. The care of the birds was committed to 300 men, besides their

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their physicians, who administered remedies to their distempers. For the support of the birds of prey 500 turkies were killed daily; and the wild beasts were fed upon deer, rabbits, hares, &c. and the intestines of human sacrifices. Montezuma also collected for his amusement all irregularly formed men. All his palaces were surrounded with pleasant gardens, in which was every kind of beautiful flower, odoriferous herb, and medicinal plant. It had likewise woods enclosed with walls, and furnished with variety of game, in which he frequently sported. In one of the royal buildings was an armoury, filled with all kinds of offensive and defensive arms: and he employed a number of artificers in manufacturing these, and also artists, such as goldsmiths, mosaic-workmen, sculptors, painters, and others. One whole district consisted solely of dancing-masters, who were trained up to entertain him. His zeal for religion was no less conspicuous than his munificence. He built several temples to his gods, and made frequent sacrifices to them, observing with punctuality the established rites and ceremonies. However, his mind was totally debased, by the vain fear of the auguries and pretended oracles of the false divinities to whom he dedicated temples. He was inexorable in punishing those who resisted his orders, or transgressed the laws of the kingdom; and he often put the integrity of his magistrates to the test by secret presents, and if he found them guilty, he inflicted severe penalties. He was an implacable enemy to idleness, every species of which he restrained or corrected. With many good qualities which he possessed, he blended a disposition to oppress his people by the imposition of heavy burdens, in order to support his own folly and extravagance, which disgusted them; notwithstanding the liberal donations which he bestowed on individuals, and particularly on his generals and ministers.

With the exception of the war against the republic of Tlascala, in which he was unsuccessful, he subdued several provinces, and extended the kingdom, as it is said, to the boundaries of Nicaragua. Montezuma, whose fate was decided after Cortes took possession of Mexico, reigned almost eighteen years, and died in June, 1520. He was succeeded by his brother, Cuiclahuatzin, or Guatimozin, as he is usually called, who ascended the throne in the beginning of July, 1520, and reigned about three months, when he was taken prisoner and strangled by order of Cortes, because he had planned a revolt after having sworn homage to the emperor Charles V., then king of Spain. His successor was Quauhquemotzin, who finished his reign on the 13th of August, 1521, having been made prisoner by the Spaniards just as Mexico was taken. His reign could not have lasted more than nine or ten months.

Although Juan de Grijalva, who was appointed by Velasquez to the command of a small expedition for discovery, consisting of four ships, and 240 volunteers, first landed in the territory of New Spain, on the island of Cozumel, E. of Yucatan, on the 3d of May, 1518, and gave the country this appellation, he returned to Cuba without making any considerable progress towards the reduction of it. Velasquez, however, hastened his preparations for a new expedition, and he appointed Fernando Cortes for the commander of it. Of this expedition, and the successful issue of it, in the capture of Mexico, and the subjugation of the Mexican empire, we have given an ample account under the article CORTES. We shall now avail ourselves of the information collected by Dr. Robertson, relating to the Mexicans and their empire, and at the same time introduce the occasional reflections of Clavigero, Estalla, and other writers. Little dependance can be placed on the accounts given of the policy and order established in the Mexican monarchy by

Cortes and his adherents. The genius and manners of the people must be inferred from incidents, which they occasionally mention, rather than from their own deductions and remarks. The obscurity in which the ignorance of its conquerors involved the annals of Mexico, was augmented by the superstition of those who succeeded them. As the memory of past events was preserved among the Mexicans by figures painted on skins, or cotton cloth, or on the bark of trees, the early missionaries conceiving them to be monuments of idolatry, which ought to be destroyed, in order to facilitate the conversion of the Indians, committed them to the flames by order of Juan de Zummaraga, the first bishop of Mexico. Thus the knowledge of remote events, which such rude monuments might furnish, was almost entirely lost, and no information remained concerning the ancient revolutions and policy of the empire, but such as was derived from tradition, or from some fragments of their historical paintings, that escaped the barbarous researches of Zummaraga. Tradition, it is well known, is a very unsatisfactory source of information with regard to events long since past; and the Mexican paintings, which are supposed to have served as annals of their empire, are few in number, and of ambiguous meaning; and are not worthy of that confidence, which some historians of Mexico, and particularly Clavigero, have reposed in them.

According to the report of the Mexicans themselves, their empire was not of long duration. Their country, as they relate, and as is evident from the details which we have already given, was originally possessed, rather than peopled, by small independent tribes, whose mode of life and manners resembled those of rude savages. However, at a period corresponding to the tenth century in the Christian era, several tribes moved in successive migrations from unknown regions towards the N. and N.W., and settled in different provinces of Anahuac, the ancient name of New Spain. Some of these, more civilized than the original inhabitants, began to form them to the arts of social life. At length, towards the commencement of the 13th century, the Mexicans, a people more polished than any of the former, advanced, as we have already stated, from the border of the Californian gulf, and took possession of the plains adjacent to a great lake near the centre of the country. After residing there about 50 years, they founded a town, since known by the name of Mexico, which afterwards became very considerable. The Mexicans, long after they were established in their new possessions, continued, like other martial tribes in America, unacquainted with regal dominion, and were governed in peace, and conducted in war, by such as were entitled to pre-eminence on account of their wisdom or valour. Among them, as in other states whose power and territories become extensive, the supreme authority at last centered in a single person; and when the Spaniards, under Cortes, invaded the country, Montezuma was the ninth monarch who had swayed the Mexican sceptre, not by hereditary right, but by election. Such is the traditional account given by the Mexicans themselves, of the origin and progress of their empire; and its duration appears to have been short. From the first migration of their parent tribe, they can reckon little more than 300 years: and from the establishment of monarchical government not above 130 years, as some say, or, according to others, 197 years, had elapsed. Allowing it a duration corresponding to the Spanish accounts of its civilization, it is difficult to conceive how, among a people who possessed the art of recording events by pictures; and who considered it as an essential part of their national education, to teach their children to repeat the historical songs which celebrated the exploits of their ancestors,

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cestors, the knowledge of past transactions should be so limited. But adopting their own system with regard to the antiquity of their nation, it is no less difficult to account either for that improved state of society, or for the extensive dominion to which their empire had attained when it was first visited by the Spaniards. The recent origin of the Mexicans seems to be a strong presumption of some exaggeration in the splendid descriptions which have been given of their government and manners. In the history of the Mexicans some facts occur, says Dr. Robertson, that suggest an idea of considerable progress in civilization in the Mexican empire, and others which seem to indicate that it had advanced but little beyond the savage tribes around it. Our historian of America has stated these facts. The right of private property was perfectly understood, and established in its full extent. Real and moveable possessions, property in land and in goods, were accurately distinguished; and both might be transferred from one person to another by sale or barter; or both might descend by inheritance. Every person, who could be denominated a freeman, had property in land; which was held by various tenures. Some possessed it in full right, and it descended to their heirs; the title of others was attached to the office or dignity which they retained. These two modes of occupying land were deemed noble, and belonged to citizens of the highest class. But the tenure by which the great body of the people held was of a very different kind. In every district a certain quantity of land was measured out, in proportion to the number of families. This was cultivated by the joint labours of the whole; its produce was deposited in a common warehouse, and divided among them according to their respective exigencies. The members of the "Calpulle," or associations, could not alienate their share of the common estate; it was an indivisible permanent property, destined for the support of their families. Whilst the territory of the state was thus distributed, every man had an interest in its welfare, and the happiness of the individual was connected with the public security.

Another circumstance that deserves to be mentioned was the magnitude and number of their cities. In a rude state of society, men have no very operative inducements to crowd together. From choice, and also from necessity, they live dispersed. But when the Spaniards entered New Spain, they were astonished to find the natives assembled in towns which resembled in their extent those of Europe. Zempoalla, though a town of the second or third size, excited their admiration, and they compared it to cities of the greatest note in their own country. But when they afterwards became acquainted with Tlascala, Cholula, Tacuba, Tezeuco, and Mexico itself, their astonishment increased, and they were led to entertain ideas of their magnitude and populousness bordering on what is incredible. Cortes and his companions, little accustomed to estimate and compute the number of people in such cities, and strongly tempted to magnify, in order to exalt the merit of their own discoveries and conquests, might have been betrayed into error, and might have raised their descriptions considerably above the truth. Dr. Robertson therefore conceives, that abatements ought to be made in their calculations of the number of inhabitants in the Mexican cities, so that the standard of their population should be fixed much lower than they have done; nevertheless our author acknowledges that they are cities of such consequence as are not to be found but among people who have made some considerable progress in the arts of social life.

Another circumstance that ought to be regarded is the separation of professions, which is a symptom of improvement. The savage can form his bow, point his arrow,

rear his hut, and hollow his canoe, without the assistance of any person more skilful than himself: but in proportion as refinement spreads, the distinction of professions increases, and they branch out into more numerous and minute subdivisions. Among the Mexicans, this separation of the arts had taken place to a very considerable degree. The functions of the mason, the weaver, the goldsmith, the painter, and of several other crafts, were carried on by different persons.

The distinction of ranks established in the Mexican empire is another circumstance that merits attention. The great body of the people was in a most humiliating state. Some, denominated "Mayeques," were attached, as it were, to the soil, and conveyed with the lands on which they were settled; others felt the utmost rigour of domestic servitude; and they were held in such low estimation, that a person who killed one of these slaves was not subjected to any punishment. Even those considered as freemen were treated by their haughty lords as beings of an inferior species. The nobles, possessed of ample territories, were divided into various classes, to which peculiar titles of honour belonged. Some of these titles descended with the lands from father to son in perpetual succession. Others were annexed to particular offices, or conferred, during life, as marks of personal distinction. The monarch, exalted above all, enjoyed extensive power, and supreme dignity. The respect attached to these different ranks corresponded to their gradation of dignity; and this respect, due from inferiors to superiors, was so established, that it incorporated with the language, and influenced its genius and idiom. The Mexican tongue abounded in terms of reverence and courtesy. It is only in societies, which time and the institution of regular government have moulded into form, that we find such an orderly arrangement of men into different ranks, and such nice attention paid to their various rights.

The political constitution of the Mexicans is an object deserving of consideration; more especially as it has been misunderstood and misrepresented by the Spaniards. The aspiring ambition of Montezuma introduced innovations upon the Mexican policy; and introduced a pure despotism. He disregarded the ancient laws, violated the privileges held most sacred, and reduced his subjects of every order to the condition of slaves. The chiefs or nobles of the first rank wished to shake off the yoke which he had imposed, and in hopes of recovering their rights, many of them courted the protection of Cortes, and joined a foreign power against their domestic oppressor. We must therefore look back beyond the reign of Montezuma in order to discover the form and genius of Mexican policy. The body of citizens, called nobility, formed the most respectable order in the state. They were of various ranks, and considerable with regard to number. Of this order there were 30 in the Mexican empire, each of whom had in his territories about 100,000 people; and subordinate to these, there were about 3000 nobles of a lower class. The territories belonging to the chiefs of Tezeuco and Tacuba were hardly inferior in extent to those of the Mexican monarch. Each of these possessed complete territorial jurisdiction, and levied taxes from their own vassals. But all followed the standard of Mexico in war, serving with a number of men in proportion to their domain, and most of them paid tribute to its monarch as their superior lord.

Traces of feudal policy, in its most rigid form, are discernible in the Mexican constitution, exhibiting its distinguishing characteristics, a nobility possessing almost independent authority, a people depressed into the lowest state of subjection, and a king entrusted with the executive power

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of the state. But the jurisdiction of its crown was very limited, and all real and effective authority was retained by the Mexican nobles in their own hands. Without their consent the king could undertake no measure of importance. At first they elected the king, and afterwards the choice was committed to six electors, of whom the chiefs of Tezcuco and Tacuba were two. Their choice was guided by a view to the activity and valour of their prince more than to the order of birth; so that collaterals of mature age or distinguished merit were often preferred to those who were nearer the throne in direct descent. Thus the Mexicans secured a succession of able and warlike princes, who raised their empire in a short period to that extraordinary height of power, which it had attained when Cortes landed in New Spain. The monarchs, restrained at first, gradually advanced in power and in the splendour of their government, a striking instance of which was presented to the view of the Spaniards in Montezuma's court; but it was not merely in a parade of royalty that the Mexican monarchs exhibited their power; they manifested it more beneficially in the order and regularity with which they conducted the internal administration and police of their dominions. Their attention in providing for the support of government was no less sagacious than the actual administration of it. Taxes were laid upon land, upon the acquisition of industry, and upon commodities of every kind exposed to sale in the public markets; these taxes were equally laid, and, as the use of money was unknown, they were paid in kind. The internal police of the Mexican empire extended to the appointment of couriers for conveying intelligence, to the structure and government of the capital, to its accommodation with water by means of aqueducts, and to a variety of other circumstances respecting the convenience and comfort of its inhabitants. The attention that was manifested in regulations of this kind was such as polished nations have been late in acquiring and exercising.

The progress of the Mexicans in various arts is alleged as a farther decisive proof of their superior refinement; but on this subject some Spanish authors have been charged with exaggeration. The Mexican paintings which some have extravagantly extolled are represented by others as uncouth delineations of common objects, or very coarse images of the human and other forms, devoid of grace and propriety. In the armoury of the royal palace of Madrid, are shewn suits of armour, which are called Montezuma's; they are composed of thin lacquered copper-plates. Dr. Robertson says, that, in the opinion of intelligent judges, these are evidently eastern. Clavigero, with great ardour, and not without some rudeness of attack on the learned historian, maintains that these are really Mexican; because we are certain, from the testimony of all the writers of Mexico, that those nations used such plates of copper in war, and that they covered their breasts, their arms and thighs with them, to defend themselves from arrows; whereas we do not know that such were ever in use among the inhabitants of the Philippine isles, to which Dr. R. refers them, or among any other people who had commerce with them. The Mexicans, says Clavigero, could boast of many inventions worthy of immortalizing their name, such as, besides those of casting metals and mosaic works of feathers and shells, the art of making paper, those of dyeing with indelible colours, spinning and weaving the finest hair of the rabbits and hares, making razors of a stone called "itztli," which they manufactured with such expedition, that in an hour an artist could finish more than 100, making beautiful looking-glasses of this stone set with gold, the cutting and polishing of gems, breeding of the cochineal, and making use of its colour, preparing of cement for the pavements of their houses, &c. &c. Their potters

were famous; and their carpenters wrought several kinds of wood with instruments made of copper. They had also various manufactures of cloth, using cotton for wool, feathers for silk, with the hair of the rabbit and hare, for lint and hemp, ixotl, or mountain palm, &c.

In the wooden prints or copper-plates of their paintings, that have been published by various authors, every figure of men, quadruped, or birds, as well as every representation of inanimate nature, is extremely rude and awkward. But though the Mexican paintings may be ranked low, as works of art, they may be regarded in a higher point of view, when considered as the records of their country, as historical monuments of its policy and transactions; and they become interesting objects of attention. Of their picture writing, some singular specimens have been preserved. The most valuable of these have been published by Purchas in 66 plates, and divided into three parts. The first contains the history of the Mexican empire under its ten monarchs. The second is a tribute-roll, representing what each conquered town paid into the royal treasury. The third is a code of their institutions, domestic, political, and military. Another specimen of Mexican painting has been published in 32 plates by the archbishop of Toledo. The style of painting is the same in all; they represent *things* not *words*; exhibiting images to the eye, not ideas to the understanding; and they may, therefore, be considered as the earliest and most imperfect essay of men in their progress towards discovering the art of writing. The plates already mentioned indicate some approach to the plain and simple hieroglyphic, where some principal part or circumstance in the subject is made to stand for the whole; and the Mexicans seem also to have advanced farther towards the use of the more figurative and fanciful hieroglyphics. In order to describe a monarch, who had enlarged his dominions by force of arms, they painted a target ornamented with darts, and placed it between him and those towns which he subdued. For the notation of numbers the Mexican painters had invented artificial marks, or "signs of convention;" by means of which they computed the years of the reigns of their kings, as well as the amount of tribute to be paid into the royal treasury. The figure of a circle represented unit, and in small numbers the computation was made by repeating it. Larger numbers were expressed by a peculiar mark, and they had such as denoted all integral numbers, from 20 to 80,000. Though they had proceeded far, they had a long course farther to pursue from the delineation of real objects to the simplicity and ease of alphabetical writing.

Their mode of computing time may be considered as a more decisive evidence of their progress in improvement. They divided their year into 18 months, each consisting of 20 days, amounting in all to 360. But as they observed that the course of the sun was not completed in that time, they added five days to the year. These were termed "supernumerary" or "waste" days; and as they did not belong to any month, no work was done, nor sacred rite performed on them, but they were devoted wholly to festivity and pastime. It appears, says Clavigero, from the chronology of the Mexicans, that they not only counted 365 days to the year, but that they also knew the excess of about six hours in the solar above the civil year, and remedied the difference between them by means of 13 intercalary days, which they added to their century of 52 years. The names of their 18 months were taken both from the employments and festivals which occurred in them, and also from the accidents of the season which attended them. The Mexicans, in order to represent a month, painted a circle or wheel, divided into 20 figures, signifying 20 days. To represent a year they

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painted another, which they divided into 18 figures of the 18 months, and frequently painted within the wheel the image of the moon. The century was represented by a wheel divided into 52 figures, or rather by four figures which were 13 times designed. They used to paint a serpent twisted about the wheel, which pointed out, by four twists of its body, the four principal winds, and the beginnings of the four periods of 13 years. See figures of these wheels in Clavigero's Hist. of Mexico.

Such are the principal facts that indicate the progress of the Mexicans towards civilization. On the other hand, there are several circumstances which serve to shew that their character, and many of their institutions did not differ greatly from those of the other inhabitants of America. Their wars, like those of the rude tribes around them, were continual and ferocious; and even in their civil institutions we discover traces of that barbarous disposition which their system of war inspired. Their funeral rites were not less sanguinary than those of the most savage tribes; so that upon the death of any distinguished personage, especially the emperor, a number of his attendants were chosen to accompany him into the other world; and these unfortunate victims were put to death without mercy, and buried in the same tomb. Their agriculture was in a very imperfect state, so that they were often constrained to live on the spontaneous productions of the earth. The difficulty of rearing a numerous family, induced the Mexican women to keep the children at the breast for several years, during which time they did not cohabit with their husbands. Clavigero, however, asserts, that the Mexicans not only cultivated most diligently all the lands of their empire, but by wonderful exertions of industry, created to themselves new territory for cultivation, by forming those floating fields and gardens on the water, which have been highly celebrated by Spaniards, and other foreigners, and are still the admiration of all who sail upon their lakes. They had not only, says this writer, all the plants which were necessary for food, for clothing, and medicine, but likewise the flowers and other vegetables which contributed solely to luxury and pleasure, were plentifully cultivated by them. Cortes, in a letter to Charles V., dated Oct. 1520, says, "the multitude of inhabitants in these countries is so great, that there is not a foot of land left uncultivated."

Although the Mexican empire was extensive, the Spanish historians have enlarged it far beyond its true boundaries, and they have represented the dominion of Montezuma as stretching over all the provinces of New Spain, from the N. to the southern ocean. But we have already stated that many of the countries said to have been included in the empire of the Mexicans did not belong to it. The Otomies were an uncivilized people, occupying a mountainous country. The Chechemecas, who occupied the provinces N. and W. of Mexico, were a mere nation of hunters. None of these recognized the Mexican monarch as their superior. Tlascalala, at the distance of 21 leagues from the capital of the empire, was an independent and hostile republic. Cholula, though still nearer, had been subjected but a short time before the arrival of the Spaniards. Tepeaca, distant 30 leagues from Mexico, was a separate state, governed by its own laws. Mechoacan, the frontier of which extended within 40 leagues of Mexico, was a powerful kingdom, remarkable for its implacable enmity to the Mexican name. Thus limited in its extent, its various provinces had no considerable mutual intercourse. They had no roads for facilitating the communications of one district with another; inasmuch that when the Spaniards first attempted to penetrate the country, they were under a necessity of opening their way through forests and

marshes. As a farther proof of the imperfection of their commercial intercourse, it has been alleged that they had no money, or universal standard by which they might estimate the value of commodities. Their trade was carried on by barter, and this affords an evidence of the infant state of their police. If by money be understood a sign representing the value of all merchandize, as Montesquieu defines it, it is certain, says Clavigero, that the Mexicans, and all other nations of Anahuac, except the barbarous Chechemecas and Otomies, employed money in their commerce. The cacao had its fixed value, and was reckoned by numbers; but to save the trouble of counting it, when the merchandize was of great value, and worth many thousands of the nuts, they knew that every bag of a certain size contained three xiquipilli, or 24,000 nuts. There were several species of cacao, some of which were used in their diet and beverages, but others were in constant circulation as money, and used in no other way than in commerce. In the capital itself of Mexico, where from 18 to 20,000 crowns (pesos fuertes) are annually coined in gold and silver, the poor people still make use of the cacao to purchase small articles in the market.

It has been further argued, that their cities, though extensive and populous, seemed to have been better adapted for the habitations of men just emerging from barbarity, than the residence of a polished people. The structure of the houses, even in Mexico, was for the most part mean; nor does the fabric of their temples and other public edifices appear to have been such as entitled them to the high praises bestowed upon them by many Spanish authors. Their edifices in general appear to have been meanly built with turf and stone, and thatched with reeds; nor have we any satisfactory evidence, notwithstanding the assertion and pretended evidence of Clavigero, that they used lime. The great temple of Mexico was a square mound of earth, 90 feet wide, partly faced with stone, with a quadrangle of 30 feet at the base, on which was a shrine of the deity, probably of wood. The stairs were made of large stones, and consisted of 114 steps, each a foot high; and at the eastern extremity were raised two towers to the height of 56 feet. Cortes affirms, that within the enclosure of the wall which encompassed the temple, a town of 500 houses might have stood. Although their architecture, says Clavigero, is not to be compared with that of the Europeans, it was certainly greatly superior to that of most of the people of Asia or Africa. Who would form a comparison between the houses, palaces, temples, bastions, aqueducts, and roads of the ancient Mexicans, and the miserable huts of the Tartars, Siberians, Arabs, and other wretched nations which live between the Cape de Verd, and the Cape of Good Hope; or the buildings of Ethiopia, of a great part of India, and the Asiatic and African isles, except those of Japan? The houses of the emperor and those of the principal nobility, it has been said, exhibited some elegance of design, and a commodious arrangement of the apartments into which they were distributed. But on the other hand it is observed, that no remains of them are visible, nor are there any ruins, which can justly be considered as monuments of their ancient magnificence. Eitalla, cited by Pinkerton, observes, that those great palaces, gardens, and temples, those immense and populous cities subject to Mexico, and whose kings were tributary to Montezuma; that high and vast wall which divided the Mexican empire from the republic of Tlascalala, and the other wonders related by historians, should at least have left some few ruins in testimony of their existence, even granting that the Spaniards entertained the extravagant wish of destroying all, in order that they might

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be obliged to construct, with great labour and expence, other edifices far inferior.

The chief remaining antiquities of the Mexicans appear to be earthen ware, in which the Indians of Guadalupe and Mechoacan excel to this day; as the Tarascan of the Peribanez, in that of japanning, the black colour lasting as long as the wood itself, while the figures equal those of the Chinese artists, and the gilding in gold and silver is of great lustre and permanency. Dr. Robertson concludes upon the whole, that though the state of society in Mexico was considerably advanced beyond that of savage tribes, yet with respect to many particulars, the Spanish accounts of their progress in civilization and refinement appear to be highly embellished. At the same time it is allowed, that the accounts given by the Spanish writers of the Mexican power, policy, and law ought not to be rejected, or censured, as the fictions of men who wished to deceive, or who delighted in the marvellous.

With regard to religion, the Mexicans have probably been represented as more barbarous than they really were. Their religious tenets, and the rites of their worship, have been described as wild and cruel in an extreme degree. Religion, among the Mexicans, was formed into a regular system, with its complete train of priests, temples, victims, and festivals. From the genius of the Mexican religion we may form a just conclusion with respect to its influence upon the character of the people. The aspect of superstition in Mexico was gloomy and atrocious. The divinities were clothed with terror, and delighted in vengeance. The figures of serpents, tygers, and other destructive animals, decorated their temples. Fear was the only principle that inspired their votaries. Fasts, mortifications, and penance, all rigid, and many of them excruciating to an extreme degree, were the means employed to appease the wrath of their gods, and the Mexicans never approached their altars without sprinkling them with blood drawn from their own bodies. But of all offerings, human sacrifices were deemed the most acceptable. As their religious belief was blended with the implacable spirit of vengeance, and added new force to it, every captive taken in war was brought to the temple, devoted as a victim to the deity, and sacrificed with rites no less solemn than cruel. The heart and head were the portion of the gods; while the body was resigned to the captor, who, with his friends, feasted upon it. Under the impression, thus produced, the spirit of the Mexicans was unfeeling, and the genius of their religion counterbalancing the influence of policy and arts, their manners, instead of being softened, became more fierce. Although the Mexicans had some confused idea of a supreme, independent being, to whom fear and adoration were due, they represented him under no external form, because they believed him to be invisible, and they named him by the common appellation of God, in their language denominated "Teotl;" and they applied to him certain epithets expressive of grandeur and power. They called him "Ipalnemoani," *i. e.* he by whom we live, and "Tloque Nahuaque," *i. e.* he who has all in himself. But their principal worship seems to have been directed to an evil spirit, the enemy of all mankind, called "Tlaccatecolotl," or, rational Owl, and they said that he often appears to men for the purpose of terrifying them or doing them an injury. They considered the human soul as immortal, allowing immortality also to the souls of brutes. They believed in a kind of transmigration, and thought that the souls of soldiers who died in battle or in captivity among their enemies, and those of women who died in labour, went to the house of the sun, to lead a life of delight; but they supposed that after four years of this glorious life, they animated birds of beautiful feathers and

of sweet song, with liberty to rise again to heaven, or to descend upon the earth. The souls of inferior persons were supposed to pass into weazels, beetles, and such other meaner animals. The souls of those that were drowned, or struck by lightning, of those who died by dropsy or other diseases, went, along with the souls of children, to a cool and delightful place, the residence of "Tlalocan," where they enjoyed the most delicious repasts. The abode of those who suffered any other kind of death was the "Mictlan," or hell, which they conceived to be a place of utter darkness. The Mexicans are said to have had a clear tradition, somewhat corrupted by fable, of the creation of the world, of the universal deluge, of the confusion of tongues, and of the dispersion of the people; and these events were actually represented in their pictures.

Among all the deities worshipped by the Mexicans, which were very numerous, there were 13 principal or greater gods, in honour of whom they consecrated that number. The greatest god, after the invisible god or supreme being, was "Tezeatlipoca," the god of providence, the god of the world, the creator of heaven and earth, and the maker of all things. He was always young, so that no length of years diminished his power, and to him it belonged to confer benefits on the just, and to punish the wicked with diseases and other afflictions. Among their greater gods were also the sun and moon, the god of the air, "Tlaloc," the god of water, to whom they ascribed the fertility of the earth and the protection of their temporal goods; to him they consecrated a temple, and in honour of him celebrated festivals every year; the god of fire, who was greatly revered in the Mexican empire; "Centeotl," or goddess of the earth and of corn, who had five temples in Mexico and three annual festivals; the god of hell, and his female companion, much honoured by the Mexicans; the god of night, to whom they recommended their children, that they might sleep; and "Mexitli," the god of war, most honoured by the Mexicans and regarded as their chief protector. There were other gods of commerce, fishing, hunting, &c. They had also 260 gods, to whom they consecrated as many days. The number of images by which the gods were represented and worshipped in the temples, the houses, the streets, and the woods, were almost infinite. These images were generally made of clay, and certain kinds of wood and stone; but sometimes of gold and other metals, and some of gems. The most extraordinary idol of the Mexicans was that of "Huitzilopochtli," which was formed of certain seeds pasted together by human blood. The divinity of these false gods was acknowledged by prayers, kneeling, and prostrations, with vows, fasts, sacrifices, and various rites. In their prayers they turned their faces towards the east, and their sanctuaries were constructed with their doors to the west. Annexed to the great temple, which we have already mentioned, were various other buildings; and the temples in the whole city of Mexico have been reckoned to amount to 2000, and that of the towns to 360. Each temple had its own lands and possessions, appropriated to its support. The number of the priests corresponded with that of the gods and temples; among these there were several orders and degrees, the chief of whom were two high priests, who were consulted in all affairs of moment, to whom it belonged to anoint the king after his election, and to open the breasts and take out the hearts of the human victims, at the most solemn sacrifices. The high priests of Mexico were distinguished by a tuft of cotton, hanging from their breasts, and at the principal feasts they were dressed in splendid habits, on which were represented the insignia of the god whose feast they celebrated. All the offices of religion were

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divided among the priests; four times a day they offered incense to the idols. The dress of the Mexican priests consisted of a black cotton mantle, which they wore in form of a veil over their heads. They never shaved themselves, so that the hair of many of them reached to their legs, and it was twisted with thick cotton cords, and bedaubed with ink. The austerities and voluntary wounds of the priests, their filthy and poisonous ointments, and their other abominable rites, as they are related by Clavigero, form a system of religion, if we may thus profane the name of religion, the most execrable that ever appeared, no less dishonourable to God than pernicious to man; and it unquestionably does not warrant our entertaining any very exalted notions of their refinement and civilization. The human victims sacrificed at the consecration of two temples were 12,210!

This system is, as Pinkerton very justly observes, so totally unlike any that was ever practised in any part of Asia, that it affords a kind of presumption, either that the people were indigenal, or proceeded from Africa, in which alone (as among the Giagas) such cruelties may be traced. The Asiatic religions seem to be universally mild, and even gay, as natural in the worship of a being who is benevolence itself; while in Africa the preponderance of the evil spirit seems to have been acknowledged by many nations. It should be recollected, however, that the Manichean system was not restricted to Africa; and that the devil, or wicked demon, has had his votaries and worshippers in Asia, as well as Africa; and that the emigrants from thence might have brought the worst part of their system of worship along with them. We merely suggest, that this circumstance affords no convincing evidence with regard to the original peopling of this part of the world, or the remote origin of their ancestors. We must allow, that the Spaniards never sacrificed more victims than the Mexicans themselves devoted; and "the clamours of pretended philosophy will often be found in opposition to the real cause of humanity, which it aspires to defend. Could a change of manners have been effected without the use of the sword, it would have been highly desirable; but the design might have been fruitless as a sermon to a tiger or a rattlesnake. The cruelties of the Spaniards must, by candour, be partly imputed to the profusion of torture and human blood, which every where met their eyes in this unhappy country; as such scenes change the very nature of man, and inflame him like the carnage of a battle." Pinkerton. It should be recollected, however, that the Spaniards had known a religion, and ought to have imbibed its spirit, which was most justly characterised by its divine founder, as "peace on earth and good will towards men."

The Mexicans performed various superstitious rites upon the birth of children, at their marriages, and at their funerals. The child was bathed, and then the diviners were consulted as to its future fortune. He was then named; the name of boys being taken from the sign of the day on which they were born, or from some circumstances attending the birth. Men had often the names of animals, and women those of flowers. The surname was acquired from their future actions. The religious ceremony of bathing was followed by a feast, when drinking was often indulged to excess. Superstition had a great share in the Mexican marriages; but nothing occurred that was inconsistent with decency or honour. Marriage between persons in the first degree of consanguinity was forbidden, unless it was between cousins. The parents were the persons who settled all marriages, and none were ever executed without their consent. The male was thought fit to form the marriage contract at the age of 20 to 22, and the female from 16 to 18 years; and before the union

was concluded, the diviners were consulted, who decided on the happiness or infelicity of the proposed match. If their sentence was unpropitious, the young female was abandoned, and another sought. If the sentence was favourable, the young woman was demanded of her parents by certain women, who were held in respect and esteem. These women went at midnight to the house of the parents with a present, and demanded the damsel in a humble and respectful style. After a few days, these women repeated their visit, stating the rank and fortune of the youth, and gaining information what was her fortune. The parents then founded the inclinations of their daughter; and in due time a decisive answer was returned. On the day appointed for the nuptials, the parents, after exhorting their daughter to a suitable conduct, led her, with a numerous company and music, to the house of her father-in-law; if noble, she was carried on a litter. The bridegroom, and her parents, received her at the gates of the house, with four torches borne by four women. At meeting, the bride and bridegroom offered incense to each other; and the bride was led by him to the hall or chamber prepared for the nuptials. They were then seated on a mat, and a priest tied a point of the gown of the bride to the mantle of the bridegroom, and in this ceremony the matrimonial contract chiefly consisted. They then offered copal to their gods, and exchanged presents with each other. This ceremony was followed with a repast, at which the bride and bridegroom gave some food to each other, and to their guests; and after the exhilaration occasioned by drinking, a dance took place; and the married pair remained in the chamber, and continued there four days; which were passed in prayer and fasting, being dressed in new habits, and adorned with certain ensigns of the gods of their nation. The marriage bed was adjusted by the priest, and the consummation of the marriage did not take place till the fourth night. On the ensuing morning they bathed and put on new dresses, and those who had been invited adorned their heads with white, and their hands and feet with red feathers. The ceremony was concluded with making presents of dresses to the guests; and on that day the mats, canes, &c. were carried to the temple. In the Mexican empire, polygamy was allowed.

The funeral rites were more superstitious than any others, and certain persons of advanced years were appointed for the conducting of them. Having clothed the body of the deceased in a habit appropriate to his former profession or business, they gave him a jug of water, and pieces of paper with instructions, adapted to his journey into the other world. They also killed a domestic quadruped, which was to be his companion. This they buried or burned together with the body of his master. The ashes were collected and deposited in a pot, together with a valuable gem: the earthen pot was deposited in a ditch, and at the interval of fourscore days, they made oblations of bread and wine over it. At the death of kings, lords, or persons of high rank, other ceremonies were practised, for the detail of which we must refer to Clavigero; merely observing, that the bodies of the deceased were generally burned, and that the ashes of kings and lords were usually deposited in the towers of the temples.

To the education of their youth, the Mexicans paid particular attention; they are habituated from their earliest age to industry, virtue, and the forms of religion; truth was inculcated by express precepts, and the violation of it severely punished, and reverence for their parents and aged persons was sedulously inculcated. Besides their domestic education, children were sent to public schools, situated near the temples, and there they were instructed for three years in religion and good customs. Adultery among the Mexi-

Can was always punished with death, nor was any divorce allowed without the permission of the judges. Those who were guilty of incest or unnatural crimes were hanged; and incontinence was severely punished; but for simple fornication no punishment was prescribed. The penalty annexed to theft in slighter cases was mere restitution, but in concerns of greater value, slavery. A person who robbed in the market place was there banished to death. Hanging was the punishment of tutors and guardians who did not give a good account of the estates of their pupils, and also of those who squandered away their patrimony in vice. Drunkenness in youth was a capital crime, and in advanced years it was punished with severity; and in case of a nobleman, it incurred forfeiture of office and rank, and entailed infamy. The prisoners of war were generally sacrificed to their gods; and slaves were allowed to possess their property, nor was slavery entailed upon their descendants. Necessitous parents might procure relief by the sale of their children, and any freeman might sell himself for the same purpose.

The highest military dignity among the Mexicans, was that of a general of the army; and in order to encourage a military spirit, they rewarded the services of warriors with one of the three orders, called by names which denoted princes, eagles, and tigers. When they went to war, different persons from the king to those of inferior rank were distinguished by peculiar badges. The defensive arms were shields of different forms; breast-plates of cotton, arrow-proof, and other armour for the defence of other parts of their bodies; the officers and nobles had a beautiful plume of feathers on their heads; but the common soldiers were entirely naked, except a girdle round the middle. The offensive arms of the Mexicans, were arrows, slings, clubs, spears, pikes, swords and darts. They had also standards and musical instruments proper for war. Previously to a declaration of war, the alleged cause of it was submitted to the judgment of the supreme council, and before it commenced, the enemy was apprized of it. The king, or the general, gave the signal for action by the beat of a drum; and the first onset was furious; but their great aim was not to kill, but to make prisoners for sacrifices when the battle was terminated. The victors celebrated their conquest with great rejoicings, and rewarded the officers and soldiers who had taken prisoners. Before any siege was begun, the citizens removed their children, women, and sick persons to a place of security in the mountains. For the defence of their cities, they used various kinds of fortification, such as walls and ramparts, breast-works, palisades, ditches, and entrenchments; but the most singular fortifications of Mexico in particular were its temples, and especially the greater temple, which resembled a citadel. The Mexicans, though fond of war, are said to have addicted themselves to the arts of peace, and particularly to the cultivation of the earth. Although they had no ploughs nor oxen, nor any other animals proper to be employed in agriculture, they supplied the want of them by labour and industry. In the operations of the field, the men were assisted by the women; the former being employed in occupations that required the greatest exertion, and the latter in the lighter and more easy employments. In their farm-yards they had threshing floors and granaries; and of the latter some were so large as to contain 5 or 6000, or sometimes more, fanegas of maize. The Mexicans were also well skilled in the cultivation of gardens, both for use and for pleasure. They were likewise attentive to the preservation of their woods, which served for fuel, for building, and for the diversion of their king, in the pursuit of game. They also paid particular attention to the breeding of animals. Fishing, hunting,

agriculture, and the arts, furnished the Mexicans with several branches of commerce. Merchandizes were sold in their fairs and markets by number and measure; but they are said not to have used weights. Their markets were subject to various regulations for the prevention of frauds, and for securing to the king his revenue. For the convenience of merchants, Clavigero says, that they had public roads, bridges for crossing their rivers, and houses of accommodation in the mountains and uninhabited places. Their sailing vessels were guided merely by oars, and were of various sizes; and many of them were made of a single trunk of a tree. Some ancient historians, probably inclined to exaggerate, say, that the number of those which continually traversed the Mexican lake exceeded 50,000. They had also for the convenience of navigating their lake and rivers, platforms or floats of solid canes, which were tied firmly on large, hard, and empty gourds. The maritime commerce of the Mexicans was very inconsiderable. The commerce of the Mexicans, it is said, was little embarrassed or impeded by the variety of languages which were spoken in those countries; for the Mexican tongue was the most prevalent, and was every where understood. This language, says Clavigero, is entirely destitute of the consonants B, D, F, G, R, and S, and abounds with L, X, T, Z, Tl, and Tz; but although the letter L is so familiar to this language, there is not a single word that begins with this consonant; nor is there a word of an acute termination, except some vocatives. Almost all the words have the penult syllable long. Its aspirates are moderate and soft, and no occasion occurs for making the least nasal sound in pronunciation. This language, notwithstanding its want of the above-mentioned consonants, is said to be very copious, tolerably polished, and remarkably expressive. The Mexican language, like the Hebrew and French, wants the superlative term, and like the Hebrew, and some other living languages of Europe, the comparative term, which are supplied by certain particles equivalent to those which are used in other such languages. It abounds in diminutives and augmentatives; and also in verbal and abstract terms; for there is hardly a verb from which there are not many verbals formed, and scarcely a substantive or adjective from which there are not some abstracts formed. It is not less copious in verbs than in nouns; as from every single verb others are derived of different significations. The Mexicans, like the Greeks, have the advantage of making compounds of two, three, or four simple words. The arts of poetry and oratory were much exercised by the Mexicans. Dramatic, as well as Lyric, poetry was held in high estimation among these people, and they had theatres in which these kinds of compositions were rehearsed. Their music was more imperfect than their poetry; and it is said, that they had no stringed instruments. But imperfect as was their music, their dances, to which they were much addicted from their youth, were eminently graceful. Their dances, which were of various kinds, were almost always accompanied with singing, which, like their dances, was always adjusted by pulsatile instruments. The amusements of the Mexicans were not confined to the theatre and dancing; they had various games, not only for public occasions, but for the relaxation and diversion of private individuals. The Mexican paintings have been already mentioned; and they were very numerous, and applied to various purposes. Their colours were brilliant, though their designs were coarse and uncouth. We shall here add to what has been already said, that the Mexicans were skilled in sculpture; and the usual materials of their statues were stone and wood. They also valued themselves on the works which they executed by

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the casting of metals, and on those Mosaic works which were made of the molt delicate and beautiful feathers of birds. The state of medicine among the Mexicans, Clavigero has described much in detail; as he has also their surgery and their baths. Their food and drink consisted of preparations of maize, cacao, chia, and the French bean. Of animal food they partook more sparingly. They had different sorts of wine made of the magnai or Mexican aloe, the palm, and maize. Their dress was simple, consisting of a girdle about the loins, a square mantle, and a piece of square cloth with which the women wrapped themselves from their waists down to the middle of the leg. Besides this they had a little under vest, or waistcoat, without sleeves. Persons of superior station added to their dress a variety of ornaments. Besides feathers and jewels, with which they adorned their clothes, they wore ear-rings, pendants at under lip, and many at their noses, necklaces, bracelets, and rings like collars round their legs. The ear-rings and pendants of the poor were shells, pieces of crystal, amber, or some other shining little stone; but the rich wore pearls, emeralds, amethysts, and other gems set in gold. Their household furniture was mean and coarse. Their beds consisted of two coarse mats of rushes, to which the rich added fine palm mats and shirts of cotton: and the lords, linen woven with feathers. The pillow of the poor was a stone or piece of wood; that of the rich was probably of cotton. Their drinking vessels were made of a fruit similar to gourds. They made no use of candlesticks, or wax, or tallow candles, or of oil to give light. They kindled fire by the friction of two pieces of wood; and generally made use of the achiote, or rocou of the French. It is added, that they also struck fire from flint. After dinner, the lords used to compose themselves to sleep with the smoke of tobacco; the leaves of which they put with the gum of liquid amber, or some other warm odorous herbs, into a little pipe of wood, or reed, or other more valuable substance; they then received the smoke by sucking the pipe and stopping the nostrils with the fingers, so that it might pass more easily to the lungs. The deficiency of soap they supplied by a fruit and a root. As to the population of the whole Mexican empire, Estalla says that it could not have surpassed three or four millions, even including the people of Tlascala, and other towns, not subject to Montezuma.

Having given an extended account of ancient Mexico, we shall now close the article with a brief description of Mexico in its more modern state. The viceroyalty of Mexico may be regarded as the chief in Spanish America, and is extended over a territory equal to an European empire. But there are several inferior governors, named by the Spanish sovereign. A considerable part of his power consists in the patronage of all the churches. His salary was formerly 40,000 ducats, afterwards 60,000, and lastly 84,000, exclusively of the disposal of lucrative offices, monopolies, connivances, presents, &c. which sometimes rise to an enormous amount. His court is formed on the regal model, with horse and foot guards, a grand household, and numerous attendants. In their vice-royalty there are three grand tribunals, called Royal Audiences, viz. that at Guatemala, that of Mexico, and that of Guadalajara. There are a few several inferior tribunals. The population of all the Spanish provinces in North America has been estimated at little more than seven millions; of whom the natives, called Indians, are supposed to amount to four millions; and the Spaniards and inhabitants of mixed races, are computed at three millions, of which the Spaniards may constitute one-third. It is probable, however, that the whole population of Spanish North America does not exceed six millions. They have suffered much from the small-pox, and

a disease called the black vomit, which occasionally ravages like a pestilence. And besides, the number of priests, monks, and nuns is injurious to population. Estalla observes, that though he has not been able to acquire exact information concerning the population of New Spain, yet by the most intelligent computations, there are in the Intendency of Mexico 1,200,000 souls, including 140,000 for the city: and by the proportion between this province and the others, as well as by the best founded calculations, it may be supposed there are in all the kingdom, three millions and a half of inhabitants. The troops in New Spain are estimated at 43,191, including 5982 regulars, 31,523 militia, &c. and 5686 for garrisons, &c.; so that it may well be doubted whether the whole grand vice-royalty of New Spain could send into the field 15,000 effective men. The revenue which Mexico yields to the Spanish crown has been shewn by Dr. Robertson to amount to above a million sterling, but it is subject to great expences. Dr. Robertson shews, from Campomaner, that the whole produce of the American mines is 7,425,000*l.* of which the king's fifth, if regularly paid, would be 1,485,000*l.*; and it is probable that the mines of New Spain or Mexico, prior to the opulent discoveries in the N.W. provinces, did not yield above one-half of the whole amount. From Estalla we learn, that a very great augmentation has taken place in all the branches of the royal treasury in this vice-royalty; so that the sums paid into the royal treasury have been tripled, and amount annually to 19 millions of dollars, and even more. Allowing the expences of administration, salaries, &c. to amount to 4,800,000 dollars, there will be an overplus of 14,200,000 dollars; that is, more than 1,800,000*l.* sterling. These revenues increase according to the progress of agriculture, the mines, commerce, industry, and population. There are some branches of the revenue which are considerable in their amount; such are the tributes, the products of the coinage, of quicksilver, gunpowder, cards, duties on goods sold, the drink called "pulque," bulls of indulgence, tobacco, lotteries, letters, all which are under the management of the minister of state. Other branches are administered in the royal coffers by their respective superintendants; such as the duties on gold, silver-plate, the assays, tythes, ninth, various ecclesiastical concessions, titles of Castille, vendible offices, compositions and confirmations of land, cock-fighting, snow and ice, stamps, fines, &c. the product of the mines, copper, lead, tin, alum, and others. From this statement there will appear to result a clear sum of 7,800,000 pesos, or about 1,170,000*l.* sterling; and if the peso fuerte be used, one-third must be added.

The ecclesiastical revenue is also very considerable. The archbishopric of Mexico is extremely opulent; and yet deemed inferior to the bishopric of Puebla de los Angeles. The ecclesiastical courts are numerous; and the holy tribunal of the faith, or the Inquisition, is very vigilant and severe. The chapter of the cathedral comprehends 26 ecclesiastics. While the revenue of the archbishop is computed at 100,000 dollars, the dean has more than 10,000; the canons from 7 to 9000, the lesser canons from 2 to 4000; some curacies are worth many thousand ducats; and one in the archbishopric of Mexico is valued at 14,000 ducats a year; while many of the curates, in their career of ambition, become prebendaries and bishops. There are two archbishoprics, those of Mexico and Guatemala, with eight bishoprics, Puebla de los Angeles, Oaxaca, Durango, Mechoacan, Antequera, Guadalajara, Yucatan, and Chiapa. The curacies are computed at 235.

The chief city of New Spain is *Mexico*, which see; and there are many other flourishing cities in this wide empire.

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The most interesting in a commercial view are the two chief ports, Acapulco on the Pacific ocean, and Vera Cruz on the Atlantic: to these we may add, Puebla de los Angeles, Cordova, Xalapa, Queretaro, Guadalupe, and Guatemala, &c. &c. which see respectively.

The manufactures of New Spain are not of any great importance. Coarse cottons form the universal dress of the Indians. There are many tanneries; but the leather is far from being equal to the Spanish; and the same observation is applicable to the glass and earthen ware, though the materials be excellent. The commerce of New Spain is extensive and important, and has recently undergone material improvements; so that since the year 1778, when greater freedom began to be introduced, the commerce has greatly increased. Two advantages have arisen from the liberty of commerce; industrious individuals and the general mass of the people have been enriched; while the great capitals of the former monopolists returned to support agriculture and the mines. The number of shops has been greatly augmented. The imports also have been increased, so that at Vera Cruz alone they amounted, in 1792, to 14,23,000,889 dollars. See *VERA CRUZ*.

The climate of this country is singularly diversified, between the tropical seasons and rains, and the temperature of the southern and even middle countries of Europe. The maritime districts of Mexico are hot and unhealthy, so as to occasion much perspiration even in January; the inland mountains, on the other hand, present snow and ice in the dog-days. In other inland provinces, however, the climate is mild and benign, with some snow of short duration in winter; but no artificial warmth is necessary, and animals sleep all the year under the open sky. From April to September there are plentiful rains, generally after noon; hail-storms are not unknown: thunder is frequent; and earthquakes and volcanoes occasionally occur. The climate of the capital, in lat. $19^{\circ} 25'$, differs much from that of the parts of Asia and Africa under the same parallel; which difference seems to arise chiefly from the superior height of the ground. Humboldt found, that the vale of Mexico is about 6960 feet above the level of the sea, and that even the inland plains are generally as high as mount Vesuvius, or about 3600 feet. This superior elevation tempers the climate with a greater degree of cold. Upon the whole, the climate cannot be regarded as unhealthy, as the aborigines sometimes attain a great age; and the appearances of decay are not perceived till a late period of life. But though they are exempted from paying tribute after the age of sixty, yet they can rarely count the years of their existence, and they cannot always be traced in the parish registers. It appears from such facts, that the prejudices of some philosophers against the climate and productions of America are unfounded. If there be any where a marked difference in every respect, of climate, men, animals, and vegetables, it is in Africa, a most ancient part of the ancient world, that it must be sought. (See on this subject *Clavigero, ubi supra*.) The face of this interesting country is diversified by grand ridges of mountains, numerous volcanoes, some of which are covered with perpetual snow, cataracts worthy of the pencil of Rosa, delicious vales, fertile plains, picturesque lakes and rivers, romantic cities and villages, an union of the trees and vegetables of Europe and America. The soil is often a deep clay, surprisingly fertile and requiring no manure except irrigation. The progress of agriculture in this country may be partly inferred from the state of the tithes, which, in the archbishopric of Mexico, for ten years, from 1769 to 1779, amounted to 4,132,630 pesos; while, for the ten years from 1779 to 1789, they advanced to 7,830,879 pesos. A similar difference appears

in the bishoprics of Puebla, Oaxaca, Guadalupe, and Durango, which, with Valladolid, comprehend the whole vice-royalty of Mexico; Guatemala being considered as a distinct kingdom. The product of cotton might be increased: of indigo there are annually exported 1500 arrobas, and 8000 quintals of pimento: the cultivation of sugar is increased: tobacco has become an important branch: vineyards afford a favourable prospect; and the annual exports of cochineal are computed by Estalla at 23,600 arrobas; but by another computation, the quantity of cochineal exported to Spain is 460,000 pounds, colling in New Spain about 12s. per pound, and yielding at Cadiz about 13 or 14s. The people employed in this culture are estimated at between 25 and 30,000. It has been observed, by the author often cited in this article, that the produce of many articles has been tripled within these few years, such as indigo, cotton, pimento of Talasco, and, above all, the precious cochineal; while tillage, and the rearing of herds and flocks, have been far more universally diffused.

The principal rivers of this country are Rio Bravo, the Medina, Magdalena, or river of Guadalupe, that of Flores, the Ariguitas, Chicowanshi, Mexicano, Colorado, Gila, Hiaqui, Nafus, Barneja or Esquitlan, Panuco, Zacatula, Yopez, Alvarado, Grijalva, Balleze, Yare, St. Juan, and Chagre. The chief chain of mountains in Spanish North America is Topia or Sierra Madre, to which we may add the grand ridge of Tamalipa, the great chain of Apanaca, Canatagna, and Urraca. The composition of the mountains of New Spain is not accurately ascertained, but it is supposed by Humboldt and Pinkerton to be mostly of argillaceous schistus, which is a substance generally prolific of metals. The volcanoes in New Spain have been reckoned 21 from that of Soconusco in the north to that of Varu in the south. These are all on the south-western coast, and after a considerable interval they again emerge towards the eastern coast, in the vicinity of Mexico. The volcano of Orizava is considered as the most majestic in the viceroyalty. The richest silver mines of New Spain were formerly supposed to be those of Zacatecas, about 200 miles N.W. of Mexico; but at present the grand mines are at Guanajuato, between $21^{\circ} 30'$ and $22^{\circ} 30'$ N. lat. and 103° and 105° W. long., extending from N. to S. 75 miles, from E. to W. 85 miles. Humboldt estimates the population of the administration at 5,173,300, and of the capital, in N. lat. 21° W. long. 103° , about 41,000, See *GUANAJUATO*.

During 11 years from 1766 to 1778, Mr. Pinkerton states, that there were coined at Mexico 203,882,948 pesos, seven reals; but, during another 11 years, from 1779 to 1791, there were coined 252,042,419 pesos, and half a real; the difference being more than 48,000,000. Before the freedom of commerce, the coinage never exceeded 20,000,000 of pesos; and in 1792, 1793, it annually surpassed 24,000,000. In the viceroyalty are found many other metals besides gold and silver. Not far from the capital are mines of tin; this metal is also found in New Mexico. Clavigero says, that the Mexicans used thin pieces of tin and bits of copper for money. Copper is obtained from the rich mines of Guanajuato and also in mines W. of Pasquaro, the capital of Mechocan. Lead is among the products of New Leon. New Spain also furnishes amber and asphalt, and a few diamonds; the mountains also produce jasper, marble, alabaster, magnet, steatite, jade and talc. The "Tetzontli," red and porous, was used in building, being perhaps, as Pinkerton suggests, a kind of tufa; and the "Itzli," mentioned in a preceding part of this article, as used for mirrors and razors, is called "pietra del Galinazzo" in South America, and is the obsidian or volcanic glass of modern mineralogy. In this country

MEXICO.

try have been found, among the fossils, the bones of elephants; bones of this kind were found in digging the foundations of the convent of Guadalupe near Mexico; and they have been found in other places. They are the same with those of the mammoth of Siberia and North America, and belonged to an animal now extinct. Pinkerton's Geography, vol. iii.

MEXICO *Proper*, a district or territory of the domain or viceroyalty of Mexico, forming part of the ancient Mexican empire, already amply described in the preceding article.

MEXICO, signifying according to Clavigero the place of *Mexitli*, or Huitzilopochtli, *i. e.* the Mars of the Mexicans, on account of the sanctuary there erected to him, the chief city not only of Mexico or New Spain, but of old Spanish America. It is situated, in a beautiful vale, on fenny ground near the banks of the lake of Tezenco, and crossed by numerous canals, the houses being all founded on piles. Hence it would seem that the waters of the lake have diminished, so as to leave a fenny morass on the west; and it is not improbable that this might happen after the inundation of 1629, when a wide canal was led through a mountain to drain the lake. The seat of the modern Mexico is the same with that of the ancient city; the viceroy residing on the spot of Montezuma's palace, in a large mansion built by Cortes, and still rented at 4000 ducats from the marquises de Valle, his descendants. The ancient city is said to have been situated upon a small island in the forementioned lake; and N. of its junction with that of Chalco, and on the W. side of the lake of Tezcuco, accessible on the W. side by three large causeways of earth and stone, but on the E. side there was no communication otherwise than with canoes or boats. The circumference of the city, exclusive of the suburbs, measured more than 10 miles, and the number of houses was at least 60,000. The city was divided into four quarters, and each quarter into several districts, bearing Indian canoes. The four quarters were divided by four broad roads, which led from the four gates of the area of the greater temple. To the four parts into which the city was divided from the first foundation A.D. 1325, the city of Tlatlalolco was added as a fifth, situated towards the N.W. having been united after the conquest of king Axajacatl to Tenochtitlan, and both together formed Mexico. Around the city there were many dykes and reservoirs for collecting water, and within it many canals, so that there was hardly a district that could not be approached by boats. Among the various buildings of the city, besides temples and magnificent royal palaces, there were other palaces in which the feudatory lords resided when they attended the business of the court. All the houses, it is said, those of the poor excepted, had balconies and parapets, and some of them battlements and towers, much smaller than those of the temples; and serving for the defence of the inhabitants in their streets and houses as well as their temples. Besides the large and famous square of Tlateloco, where the principal market was held, there were other smaller markets distributed through the city, where ordinary provisions were sold; and in different places there were fountains and fish-ponds, particularly near the temples, and many gardens, some of which were laid out on the natural level of the earth, and others raised on high terraces. Of the modern city, Chappe d'Au-terroche, cited by Pinkerton, gives the following account. The streets are wide and straight, but very dirty; and the houses, resembling those of Spain, are tolerably built. The chief edifice is the viceroy's palace, which stands near the cathedral in a central square, and it is rather solid than elegant. Behind the palace is the mint, in which more than 200 workmen are employed, as the owners of the mines here

exchange their bullion for coin. The other chief buildings are the churches, chapels, and convents, which are very numerous and richly ornamented. The outside of the cathedral is unfinished, as they doubt the foundations; but the rail round the high altar is of solid silver, and there is a silver lamp so capacious that three men may go into it to clean it; and it is also enriched with lions' heads, and other ornaments, in pure gold. The images of the Virgin, and other saints, are either solid silver, or covered with gold and precious stones. Besides the great central square, there are two others, each of which has a fountain in the middle. To the N. of the town, near the suburbs, is the public walk, or "Alameda." A rivulet runs round it, and forms a pretty large square, with a basin and jet d'eau in the middle. Eight walks, each of which has two rows of trees, terminate at this basin like a star. There are also some other promenades; although the country about Mexico is swampy ground, and full of canals. Facing the "Alameda" is the "Quemadero," where they burn the Jews, and the unhappy victims of the Inquisition. It is an inclosure between four walls, and filled with ovens, into which are thrown, over the walls, the wretches that are condemned to be burnt alive; condemned, as the author says, by judges professing a religion whose first precept is charity. The Spanish inhabitants are commonly clothed in silk, their hats being adorned with belts of gold and roses of diamonds; for even the slaves have bracelets and necklaces of gold, silver, pearls, and gems. The ladies are of distinguished gallantry.

Mexico, though inland, is a place of immense commerce between Vera Cruz on the E., and Acapulco on the S.; and the shops display a profusion of gold, silver, and jewels. In magnificent regularity it yields to few cities on the ancient continent. Gage says, that, in his time, A.D. 1640, there were supposed to be 15,000 coaches, some of them adorned with gold and gems; the people being so rich, that it was imagined one-half of the families kept carriages. From the work of Eitalla, published in 1799, and quoted by Pinkerton, we derive some further information concerning this famous city.

The lake, it is said, has retired a Spanish league from the city, which circumstance is supposed to render the air less salubrious. The winter frost is gentle, and is thought severe when the ice exceeds the thickness of paper. The summer heats are tempered by the regular showers which fall in the evenings. Water-spouts often occur, but they always fall in the lake; however, they have sometimes ruined mining stations. The yearly cold at Mexico, though just within the tropic of Cancer, appears by observations on the thermometer to exceed the heat. The rainy season extends from the middle of May to the middle of September.

The plain of Mexico is, as we have already said, surrounded with mountains, covered with cedars, rare shrubs, and medicinal plants, and containing minerals and precious stones. On these mountains are romantic cottages and farms, watered by clear rivulets. In the middle of this delicious plain are the lakes Tezcuco and Chalco. The city has received no augmentation since the year 1712. The streets are well opened, running in right lines from E. to W. and from N. to S. Great improvements have lately taken place by the cleanliness and good police of the place: the city is lighted, and the streets paved, and sewers and water-courses have been opened, so that Mexico has become the largest, most beautiful, and most sumptuous of the whole Spanish monarchy. The cathedral is a magnificent edifice, the work of 94 years; it has two images of the Virgin, one of gold, which weighs 6984 castellanos, the castellano being the 50th part of a mark, and a mark being $\frac{2}{3}$ ds of a pound or eight

eight ounces. For 14 parishes, there are more than 100 other churches, most of which are neat and richly decorated. The religious houses are very numerous, and the nunneries amount to 25. Among the numerous courts and offices of justice, established in this city, are the royal audience and chancery of New Spain; the court for strangers, and those who die intestate; the royal tribunal of regillers; the royal coffer; the royal mint; the tribunal of the inquisition; the house of the missions of California; the mount of piety, erected by the charity of the count de Regla, who gave no less than 315,000 pesos; the royal tribunal of mines; that of the descendants of Cortes; the illustrious chapter, justice and government of the noble and imperial city itself, to which the ancient arms were confirmed by Charles V., being a castle with three towers, an eagle on a tree with a snake in its beak, at the foot of the tree is the lake; the whole surmounted with an imperial crown, and supported by two lions. Philip V. granted to Mexico, in 1728, all the privileges and distinctions of a grandee of Spain; and Charles III., in 1773, indulged the chapter, or magistrates, with the use of uniforms laced with gold, declaring their precedence over all tribunals and bodies, except the royal audience and tribunal of accounts. The patroness of the city is St. Mary of Guadalupe, solemnly chosen in 1737, and whose worship has extended over all Spanish America. The general character of the natives, who have a considerable disposition for the arts and boast of their eminent painters, is that of a liberal, courteous, affable, and charitable people. The city has thirteen hospitals, and other charitable establishments. The viceroy is commander in chief, and president of the economical and political government. He resides in the royal palace. He is also president of the tribunal of accounts, which inspects all those of the royal revenue. The city council consists of a corregidor or mayor, twelve regidores, or aldermen, and other officers. The common alcalds judge criminal and civil cases in the first instance subject to an appeal to the royal audience.

The city of Mexico is amply supplied with grain, fruit, and vegetables, from the environs, which are very fertile; those on the east side of the lake of Tezcuco excepted, where vegetation is impeded by the saline exhalations of the lake. The more populous parts of the city extend from north to south four English miles, and from east to west three English miles. The city is surrounded merely by a trench or ditch, without walls or other defence. There are six principal gates; and by the gate of Guadalupe all the pulque enters, which, being the general drink of the inhabitants, yields a revenue of about a million of dollars to the king. The streets are well paved. The manufactory of cigars, employing more than 5000 persons, is a modern and magnificent edifice. The consumption of cigars is very great; for all the Mexican ladies smoke tobacco; and they take their paper cigars from a case of gold or silver, hanging by a chain or ribbon, while on the other side they wear little pincers of the same metal. As soon as one cigar is exhausted, another is lighted: they smoke even at the theatre, and only cease to smoke when they eat or sleep. The tribunal of "La Acordada" was one of the most terrible in the viceroyalty; the judge, who is called captain of the holy brotherhood, being also inspector of prohibited liquors: but Charles III. ordered that the viceroy, with two or three judges, should revise the sentences. The judge of the "Acordada" has from eight to ten thousand men, dispersed through the viceroyalty, under the names of lieutenants, corporals, &c. This holy brotherhood maintains, by its

vigilant police, the public tranquillity of the city and viceroyalty, performing their rounds day and night, and speedily punishing every excess. Capital criminals are hanged in a field, called "Exido de Concha," from the name of a captain of this brotherhood; and the tribunal has become more useful, since the viceroy has obtained the privilege of reviewing sentences of death. The market for trifling and second-hand commodities is a square of shops, and the theatre is small but handsome.

Mexico is supplied with water by two aqueducts. The most splendid festivals of the Mexicans are the procession of Corpus Christi, and the entrance of a new viceroy. There are other festivals, such as the anniversary of the conquest, and the publication of the bulls of indulgence.

Although the climate of Mexico is in general salubrious, yet there are some prevalent, and even epidemic diseases. The ravages of the small-pox, however, are likely to be restrained by the Jennerian antidote, which is not unknown even in Mexico; and the black vomit, or yellow fever, is scarcely known in this city. Agues are frequent; pulmonary consumptions, apoplexies and epileptic diseases, spotted fevers and pleurisies, are not uncommon: but the most universal disease of men and women is that called "flado," or the wind, which presents singular and almost incredible symptoms; the patients appearing as if they were demoniac or frantic, sometimes excessively hot and cold by very sudden changes, laughing and weeping, and agitated by convulsions, as if they were possessed. This disease seems to proceed from the hot and unhealthy regimen, and from the abuse of tobacco, destructive alike of the nerves and stomach.

Some individual artizans are very rich, but of late property is more generally diffused: there are, however, many entailed estates, founded by the conquerors, from ten to sixty thousand dollars a-year; but the chief that remain are the products of commerce and of the mines. Within the last twenty or thirty years, the number of houses that sell "pulque" is greatly increased: they are open, by regulation of the police, only from ten in the morning till four in the afternoon, and during this interval they occasion quarrels, and sometimes murders. Estalla computes the population of Mexico at 140,000 souls; but it is probably more considerable. As there is no money of bullion at Mexico, the shop-keepers issue tokens of copper, iron, or wood, which pass in the neighbourhood; and even grains of cacao pass as small coin. The city has several useful regulations for guarding against fires, and any consequent tumults. The water-pipes have been enlarged, and ten public fountains have been constructed, with cocks instead of cisterns, which are found more convenient. The price of bread is regulated every four months, according to the price of grain. The foot-paths are guarded with little pillars; the pavement is kept in good repair, and there is a covered sewer in the middle of the streets, and the city is well lighted by large lamps of the reflecting kind. Watchmen clean and supply the lamps, and guard the houses and passengers; and the municipal troops perform their nightly rounds. In this celebrated capital great quantities of rum are distilled from the refuse of the numerous sugar-mills.

The university of Mexico, founded in 1551, is styled royal and pontifical; and the cloister is composed of two hundred and fifty-one doctors, of all faculties. It is governed by a rector, annually elected by the lesser cloister, composed of the former rector and eight counsellors, chosen by lot from the doctors and bachelors. The office of chancellor is annexed to the dignity of schoolmaster of the me-

tropolis; his office being to preside at conferring some degrees, while on other occasions he holds the second rank. The professors of this university are named by a junta, consisting of the archbishop, the regent of the royal audience, the dean of the cathedral, the oldest inquisitor, the rector of the university, the master of the metropolitan schools, the professor of the first class of theology, and the dean of the faculty. The public library of the university was founded about forty years ago, and is well furnished with old books of divinity, but is miserably deficient in new editions of the classics, or new works of science and philosophy. This library is open to the public at certain hours, except on Sundays and holidays. The college of St. Mary-of-all-Saints is the only one of the first rank in the Spanish American possessions: it has a public library. The seminary was founded by an archbishop of Mexico in 1682; and at present it has thirteen professors. The students amount to four hundred, and a new building was erected in 1750. The Jesuits had formerly five colleges, two of which only remain: they are directed by the viceroy, or a junta, of which he is president. The buildings are magnificent; the chapel and grand hall being the most beautiful in the viceroyalty. The college of St. John of Lateran is the most ancient of any in New Spain, having been founded in the reign of Charles V., for the instruction of those descended from Spanish and Indian parents. It has been improved in 1764, and again in 1789. The college of St. Jago is without the walls of Mexico, in a house of the Franciscans; but it is now merely a boarding-school for children. Other religious orders have also public schools. A college of mines has lately been erected, in which young persons are not only instructed in that science, but in other important parts of education. The royal academy of the three noble arts is a valuable institution: it is provided with good professors in architecture, painting, sculpture, and engraving; and there is also a professor of mathematics. There are also particular houses in Mexico where Latin grammar is taught by preceptors approved by the government and university.

The environs of Mexico are richly cultivated with flax, hemp, cotton, tobacco, indigo, sugar, and magneys; and furnish the city with ample supplies of meat, poultry, vegetables, and fruits. The most celebrated sanctuary in the vicinity of the city is that of our lady of Guadalupe, which has a college, a church, &c. Another sanctuary, or house of pilgrimage, is that of our lady de los Remedios, erected on the spot whither Cortes retired when he was repulsed from Mexico. Without the barrier of Santiago is the sanctuary of our lady of the Angels, formerly the residence of a hermit. At the distance of five leagues from Mexico is the desert of the Carmelites, in an enclosure about a league in circuit; the retreat of the most austere monks there being in solitary cells. The aqueduct of Chapultepec adorns the immediate environs; and on the hill so called was a palace of Montezuma. Traspansa is another place of resort, where are several good houses; and many settle there, as the air is esteemed very healthy. On the side of San Lazaro, about half a league from Mexico, is the rock of the baths, which are warm, but the quality is not ascertained. N. lat. 19° 54'. W. long. 99° 51'. Pinkerton's Geog. vol. iii.

MEXICO, *New*, a large territory of the Spanish dominions in North America, sometimes called a kingdom, but properly a single province, lying eastward of California, and divided by the gulf from that peninsula. Northwards it is bounded by high mountains and an unknown country, on the east by Louisiana, on the west by the Californian lake and Rio Coiorado, and on the south by some of the pro-

vinces of New Spain, or Mexico proper. This province was discovered by a missionary in 1581, but scarcely subdued till 1644; nor were many missions established till after the year 1660; and the capital, Santa Fé, was founded in 1682. It is a fertile and delightful province, producing maize, wheat, and excellent fruits. The mines are said to be all of tin; and the animals and plants are of singular variety. In the map of Alzate, the northern limit is marked at 38°, and the southern at 30° 30'; the medial breadth, on both sides of the Rio Bravo, being only 2°, or 120 geographical miles. Pinkerton.

MEXICO, a town of America, in Oneida county, New York, at midway between Oneida lake and Oswego, 20 miles from each. The township is extensive, comprehending a number of houses.

MEXICO, *Gulf of*, a large bay or gulf of the Atlantic, extending north to south, from the coast of Florida to the coast of Tabasco and Yucatan, about 600 miles, and east to west, from Cuba to the coast of Mexico, about 700. This gulf lies in a favourable climate, and presents at its entrance the grand archipelago of North American islands, called the West Indies. See *Gulf Stream*.

MEXIMIEUX, a town of France, in the department of the Ain, and chief place of a canton, in the district of Trevoux; 17 miles N.E. of Lyons. The place contains 1691, and the canton 8372 inhabitants, on a territory of 230 kilometres, in 14 communes.

MEYAPONTE, a river of Brasil, which runs into the Parana.

MEYENBERG, a town of Switzerland, in the Free Bailiwicks, once an independent lordship; 10 miles N. of Lucerne.

MEYENBURG, a town of Brandenburg, in the mark of Prenzitz; 60 miles N.N.W. of Berlin. N. lat. 53° 18'. E. long. 12° 15'.

MEYENFELD, a town of the Grisons, and principal place of a jurisdiction. It is said to have been the first place in which the reformation was encouraged. This town was a kind of staple for goods that passed to and from Germany and Italy; 52 miles E. of Lucerne. N. lat. 46° 57'. E. long. 9° 38'.

MEYER, JAMES, in *Biography*, an historian, was born in Flanders in the year 1491. He studied in the university of Paris, and entered into holy orders. For several years he taught school at Ypres and Bruges, and in the latter city had a benefice, in the church of St. Donatian. He died at Blankenberg, in the year 1552. He was on terms of intimacy with Erasmus, and other learned men; and wrote several works, of which the principal are, 1. "Flandricarum Rerum Decus," being an account of the origin, antiquity, nobility, and genealogy, of the counts of Flanders; and, 2. "Annales Rerum Flandricarum," which begin with the year 445, and come down to 1477. They are written in a pure and easy style, and have been reprinted in the collection of Belgic historians. Moreri.

MEYERA, in *Botany*, a genus of Schreber's, named, we presume, in honour of Dr. Frederic Albert Anthony Meyer, a physician at Göttingen who died in 1795, and who was the author of various tracts on Natural History. Willdenow has not adopted the genus, nor do we find any notice of it under *Sclerocarpus*, although its author says they are nearly allied, but belonging to different orders of the class *Syngenesia*. It must however be recollected that these orders are not always permanently distinct in nature. *Meyera* rests solely on the authority of Schreber, not having been taken up by any other author, so that we can only translate

translate his own generic character. If its habitat had been published, possibly a more clear and satisfactory reference might have been made of the plant in question. Schreb. 570.—Class and order, *Syngenesia Polygamia Superflua*. Nat. Ord. *Discoides*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyc* of four, large, broad, heart-shaped, concave, veined leaves, spreading at the top, rather acute, shorter than the disk, the two inner ones opposite. *Cor.* compound, tubular, convex; florets in the disk numerous, perfect, funnel-shaped, five-cleft, somewhat erect; those of the radius several, ligulate, lanceolate, entire. *Stam.* (in the perfect florets) Filaments five, capillary; anthers cylindrical, tubular, five-toothed. *Pist.* (in the same) Germen oblong; style thread-shaped, longer than the filament; stigmas two, revolute. In the female ones the style is longer than the florets. *Peric.* none, except the permanent calyx. *Seed* in both kinds of florets solitary, oblong, transversely compressed, crescent-shaped, striated, scaly; down none. *Recept.* convex, small; scales cartilaginous, imbricated, triangular, incurved, furrowed at the back, downy towards the top externally, oblique at the extremity, each enveloping a single seed, the outer ones a little broader.

MEYNIAC, in *Geography*, a town of France, in the department of the Correze, and chief place of a canton, in the district of Ussel. The place contains 2978, and the canton 7726 inhabitants, on a territory of 322½ kilometres, in 11 communes.

MEYNTHAL, or VAL DE MAGGIA. See MAGGIA.

MEYO, in *Commerce*, a measure for corn, salt, and other dry commodities, in Portugal; it contains 15 fanegas; each fanega being = 4 alquieres = 8 meyo = 16 quartos = 32 outavas = 64 mequias. The alquiere is = 675 French = 817 English cubic inches; so that 21 alquieres = 1 English quarter, nearly, or, more exactly, 50 alquieres = 4 alquieres of Oporto are reckoned equal to 5 alquieres of Lisbon, and 2 alquieres of Oporto, or 2½ of Lisbon, are computed to be equal to an English bushel.

MEYRINGEN, in *Geography*, a large and neat village of Switzerland, the capital burgh of Hasliand, a district in the canton of Berne, which enjoys peculiar privileges. The people are governed by their own magistrates, and only take oaths of fidelity to the sovereign council. The authority, which the bailiffs in the other cantons enjoy, is possessed in a great measure by the landamman, who resides at Meyringen. The place is situated near the Aar, in a romantic vale, surrounded by meadows of a luxuriant verdure, and sprinkled with cottages, which are occasionally separated by huge stones and deep channels, the vestiges of storms and floods; 28 miles S.E. of Thun.

MEYRUEIS, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Florac; 22 miles S. of Mende. The place contains 2890, and the canton 5235 inhabitants, on a territory of 345 kilometres, in seven communes. N. lat. 44° 11'. E. long. 3° 31'.

MEYSSAC, a town of France, in the department of the Correze, and chief place of a canton, in the district of Brives. The place contains 2072, and the canton 10,466 inhabitants, on a territory of 160 kilometres, in 14 communes.

MEYWAR. See OUDIFOUR.

MEYZIEU, a town of France, in the department of the Isere, and chief place of a canton, in the district of Vienne. The place contains 1045, and the canton 9547 in-

habitants, on a territory of 212½ kilometres, in 16 communes.

MEZA, a river of Russia, in the government of Pottok, which runs into the Dwina; 16 miles N.E. of Veliz. MEZAIR. See MESAIR.

MEZALANA, in *Geography*, a town of Italy, in the department of the Mincio; four miles S. of Mantua.

MEZANA, a town of Liomone, in the island of Corsica, and chief place of a canton, in the district of Ajaccio: the canton contains 1751 inhabitants.—Also, a town of Italy; five miles S. of Padua.

MEZANA, *La*, a town of Naples, in Basilicata; 17 miles S.W. of Turfi.

MEZANINE, or MEZZASINE, a term used by some architects, to signify an attic, or little story, contrived occasionally over the first story, for the conveniency of a wardrobe, or the like.

The word is borrowed from the Italians, who call *mezzanini* those little windows, less in height than breadth, which serve to illuminate an attic, or entresole.

MEZDA, in *Geography*, a town of Africa; 60 miles S. of Tripoli.

MEZDAGA, a town of Fez, in the province of Chau, at the foot of mount Atlas.

MEZE, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier; 15 miles S.W. of Montpellier. The place contains 2800, and the canton 8729 inhabitants, on a territory of 135 kilometres, in seven communes. N. lat. 43° 25'. E. long. 3° 42'.

MEZELIEMEINA, a town of Africa, in Tunis, on the lake Bizerta; 28 miles N. of Tunis.

MEZEMNA, a sea-port of Algiers, in the kingdom of Fez, on the coast of the Mediterranean; 80 miles E. of Tetuan. N. lat. 35° 22'. W. long. 4° 5'.

MEZEN, a sea-port town of Russia, in the government of Archangel, near the White sea, at the mouth of a river of the same name; 128 miles N.N.E. of Archangel. N. lat. 66° 30'. E. long. 43° 34'. The river rises in the government of Archangel, N. lat. 64° 15'. E. long. 49° 14', and runs in a S.W. direction to the town of Poshanskoi, when, changing its course, it runs N. westerly to N. lat. 66° 30'. E. long. 48° 34', where it flows into the Frozen ocean.

MEZEN, a mountain of France, which gives name to a district, in the department of the Ardèche; 27 miles W. of Valence.

MEZERAI, FRANCIS EUDES DE, in *Biography*, a celebrated French historian, was born in 1610, at Ry, in Lower Normandy. After studying at Caen he came to Paris, and obtained the post of an officer of the artillery, in which capacity, he served two campaigns. He then quitted the army, and retired to the college of St. Barbe, where he applied with great ardour to study, having projected a history of France, of which, under the patronage of cardinal Richelieu, he published the first volume, folio, in the year 1643. The two others appeared in 1646 and 1651. On account of this, the court recompensed his labours by a pension of 4000 livres, with the title of historiographer. This success engaged him to compose an abridgment of it under the title of "Abregé Chronologique de l'Histoire de France," in three vols. 4to.; it was reprinted in Holland, in 6 vols. 12mo. In this work he published an account of the origin of all the public imposts, with some very free reflections, which gave so much offence to the minister Colbert, that he remonstrated with the author, who pro-

mised to make the requisite corrections in the second edition. This he performed, but, at the same time, informed the readers that he was compelled to do so; and his corrections, moreover, were only palliations, he was therefore punished by withdrawing half his pension. On his making a complaint, the other half was also suppressed, upon which he declared, that he would not continue his history. On the death of Conrart, in 1675, he was elected to the vacant place of perpetual secretary to the French academy; in this situation he prepared a sketch of the projected dictionary of the academy. Mezerai died in 1683. Besides the works already mentioned, he wrote "Traité de l'Origine des François;" "L'Histoire des Turcs, depuis 1612 jusq' en 1649." A translation of John of Salisbury, "De Nugis Curialium," and of Grotius, "De veritate Relig. Christi." Mezerai was a man of great singularities in his temper and habits. He was fond of low company, and so squalid in his dress, that he was once taken up by the police for a beggar. He never wrote but by candle-light, even in the day-time, and in the midst of the summer, and he had always a bottle on the table. He affected to be a sceptic in his religion, but in his last illness his early impressions recurred, and he entreated his friends to forget his impieties, and to recollect "that Mezerai dying was more to be believed than Mezerai in health." Moreri.

MEZEREON, in *Botany*, seems by Bauhin's *Pinax* 462, and Lobel's *Adversaria* 157, to be a word of Arabian origin. In the book last mentioned it is said to belong properly to the *Cneorum iricoccum* of Linnæus, which however is not known to grow in Arabia, but in Spain and the south of France. The name is now transferred to the *Daphne Mezereon*, or *Laureola Mezereon Germanica* of the older writers, and is become the familiar English appellation of that charming shrub. See CNEORUM and DAPHNE.

MEZIDON, in *Geography*, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Lisieux; 11 miles W.S.W. of Lisieux. The place contains 528, and the canton 9089 inhabitants, on a territory of 160 kilometres, in 34 communes.

MEZIERES, a town of France, and principal place of a district, in the department of the Ardennes, situated on an island formed by the Meuse, over which it has two bridges, with a citadel; two miles S. of Charleville. The place contains 7400, and the canton 11,567 inhabitants, on a territory of 137½ kilometres, in 12 communes. N. lat. 49° 46'. E. long. 4° 47'.—Also, a town of France, in the department of the Indre, and chief place of a canton, in the district of Le Blanc. The place contains 1338, and the canton 7084 inhabitants, on a territory of 390 kilometres, in nine communes.—Also, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the district of Bellac. The place contains 1313, and the canton 9107 inhabitants, on a territory of 307½ kilometres, in eight communes.

MEZIN, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Nerac; six miles S.S.W. of Nerac. The place contains 2860, and the canton 10,136 inhabitants, on a territory of 280 kilometres, in 16 communes. N. lat. 44 3'. E. long. 0° 20'.

MEZIRIAC, CLAUDE-GASPARD BACHET, in *Biography*, was born in 1581, of a noble family at Bourg-en-Bresse. He entered among the Jesuits, and at the age of twenty was professor of rhetoric at their house in Milan. A bad state of health induced him to quit the society, and he passed much

of his time at Paris and Rome in literary pursuits. His reputation was so great, that he was mentioned as a fit person to be preceptor to Lewis XIII., but the dread of such an office induced him to quit Paris and retire to his native place. He died in 1638, leaving behind him many works that bore witness to his great erudition. He wrote verses in French, Latin, and Italian, and was a profound Greek scholar, an excellent grammarian and critic, a philosopher, theologian, and mathematician. His principal works are as follow: "Problemes plaisans et delectables que se font par les Nombres;" "Diophanti Alexandrini Arithmeticonum Lib. vi. et de Numeris multangulis Lib. i." translated from the Greek with commentaries: "La Vie d'Esopé:" "Epistolæ et Poemata varia."

MEZOUR, in *Geography*, a town of Asia, in Candahar; 63 miles N.E. of Candahar.

MEZTITLAN, a town of Mexico; 25 miles N. of Mexico.

MEZUZOTH, in the *Jewish Customs*, certain pieces of parchment, which the Jews fix to the door-posts of their houses, taking that literally which Moses commands them, saying, "Thou shalt never forget the laws of thy God, but thou shalt write them upon the posts of thy house, and on thy gates." This expression means nothing else, but that thou shalt always remember them, whether thou comest into thy house, or goest out. But the Hebrew doctors imagined, that the law-giver meant something more than this. They pretended that, to avoid making themselves ridiculous, by writing the commandments of God without their doors, or rather to avoid exposing themselves to the profanation of the wicked, they ought, at least, to write them on a parchment, and to enclose it in something. Therefore they wrote these words upon a square piece of parchment, prepared on purpose with a particular ink, and a square kind of character. (Deut. vi. 4, 5, 6, 7, 8, 9.) "Hear O Israel the Lord our God is one Lord, &c." Then they left a little space, and afterwards went on, (Deut. xi. 13.) "And it shall come to pass, if thou shalt hearken diligently to my commandments, &c.," as far as, "Thou shalt write them upon the door-posts of thy house, &c." After this they rolled up the parchment, and put it into a case of reeds, or other matter; they wrote on the end of the case the word "Shadai," which is one of the names of God; and they put it at the doors of their houses, chambers, and all places most frequented; they fixed it to the knockers of the door, on the right side; and as often as they entered in, or went out, they touched it in this place with the end of their finger, which they afterwards kissed out of devotion. The Hebrew word *mezuzza* properly signifies the door-posts of a house; but it is also given to this roll of parchment now mentioned. Leo of Modena may be here consulted.

MEZZA PAUSA, in the *Italian Music*, half a pause, intimates that the part wherein it is found must be still the time of a semibreve in common time. See PAUSE.

MEZZA Tirata. See TIRATA.

MEZZAROLA, in *Commerce*, a liquid measure of Genoa, containing for wine two barrili, or 100 pinte, and reckoned at 18 rubbi, or 45lbs. peso sottile; the mezzarola is = about 39 English gallons.

MEZZEREB, in *Geography*, an island in the Red sea. N. lat. 27° 43'.

MEZZO, an Italian adjective, which means half; as *mezzo sorte*, *mezzo piano*, *mezza voce*, which imply nearly the same thing, i. e. a middle degree of piano, or soft. *Mezzo soprano*, a pitch of voice between the *soprano* or treble, and counter-tenor. See CLEFS, and COMPASS of Voices.

MEZZO-

MEZZO-TINTO.

MEZZO-TINTO, in *Sculpture*, a particular manner of engraving figures on copper.

Mezzo-tinto is said to have been first invented by prince Rupert, about the year 1649; and Mr. Evelyn, in his *History of Chalcography*, gives us a head, performed by that prince, in his way; though Mr. Le Blon is said to have introduced it into practice with the greatest success.

The prince laid his grounds on the plate with a channelled roller; but one Sherwin, about the same time, laid his ground with a half-round file, which was pressed down with a heavy piece of lead. Both these grounding tools have been laid aside for many years; and a hand-tool, resembling a shoemaker's cutting-board-knife, with a fine crenelling on the edge, was introduced by one Edial, a smith by trade, who afterwards became a mezzo-tinto painter.

It is very different from the common way of engraving. To perform it, they rake, hatch, or punch the surface of the plate all over with a knife, or instrument made for the purpose, first one way, then the other, across, &c., till the face of the plate be thus entirely furrowed with lines or furrows, close and as it were contiguous to each other; so that if an impression was thus taken from it, it would be one uniform blot, or smut.

This done, the design is drawn, or marked on the same face; after which, they proceed with burnishers, scrapers, &c. to expunge or take out the dents or furrows, in all the parts where the lights of the piece are to be; and that more or less, as the lights are to be stronger or fainter: leaving those parts black, which are to represent the shadows, or deepnings of the draught.

As it is much easier to scrape or burnish away parts of a dark ground, corresponding with the outline of any design sketched upon it, than to form shades upon a light ground, by an infinite number of hatches, strokes, and points, which must all terminate with exactness on the outline, as well as differ in their force and manner, the method of scraping, as it is called in mezzo-tinto, consequently becomes much more easy and expeditious, than any other method of engraving. The instruments used in this kind of engravings are cradles, scrapers, and burnishers.

In this engraving, the plate must be prepared and polished in the same manner as for other engraving (see *COPPER-PLATES*); and afterwards divided equally by lines, parallel to each other, and traced out with very soft chalk. The distance of these lines should be about one-third of the length of the face of the cradle which is to be used, and these lines should be marked with capital letters, or strokes of the chalk. The cradle is then to be placed exactly betwixt the two first lines, and passed forwards in the same direction; being kept as steady as possible, and pressed upon with a moderate force. The same operation must be repeated with respect to all the other lines; till the instrument has thus passed over the whole surface of the plate. Other lines must be drawn then from the extremities of the other two sides, in the same manner; which intersecting the first at right angles, will with them form squares; and the same operation must be repeated with the cradle, as in the case of the first. New lines must then be drawn diagonally, and the cradle passed betwixt them as before; and when the first diagonal operation is performed, the lines must be crossed at right angles as the former, and the cradles passed betwixt them in the same manner. The plate having undergone the action of the cradle, according to the disposition of the first order of lines, a second set must be formed, having the same distances from each other as the first. But they must be so placed as to divide those already made into spaces one-third less than

the whole extent; *i. e.* every one after the first on each side will take in one-third of that before it, *e. g.* beginning at A, of which the first third must be left out; the third of B will consequently be taken in; and so of the rest. These lines of the second order must be marked with small letters, or lesser strokes, to distinguish them from the first; and the same treatment of the plate must be pursued, with respect to them, as was practised from the others. When this second operation is finished, a third order of lines must be made, the first of which, *e. g.* in A, must omit two-thirds of it, and consequently take in two-thirds of B, &c. By these means the original spaces will be exactly divided into equal thirds; and the cradle must be again employed betwixt these lines as before. When the whole of this operation is finished, it is called *one turn*; but in order to produce a very dark and uniform ground, the plate must undergo the repetition of all these several operations, for above twenty times; beginning to pass the cradle again betwixt the first lines, and proceeding in the same manner through all the rest. When the plate is prepared with a proper ground, the sketch must be calked on it, by rubbing the paper on the backside with chalk. It is also proper to overtrace it afterwards with black-lead or Indian ink. The scraping is then performed, by parting or cutting away the grain of the ground in various degrees; so that none of it is left in the original state, except in the touches of the strongest shade. The general manner of proceeding is the same as drawing with white upon black paper. The masses of light are first begun with; and those parts, which go off into light in their upper part, but are brown below: the reflections are then entered upon; after which the plate is blackened with a printer's blacking-ball made of felt, in order to discover the effect; and then the work is proceeded with; observing always to begin every part in the places where the strongest lights are to be.

But the present mode of this engraving is rendered still more expeditious and easy to the artist, not only in laying the ground, but in scraping the plate. Instead of using the cradle or grounding tool three times, it is now found to produce a better grain by only repeating it twice, or *double ways*, as it is called by artists. In laying the ground, the copper is ruled as formerly, and instead of taking up a third of the way already executed, it now only takes up one-half, by which means the grain of the ground, or texture, is more dotty, and has a more solid look, and consequently is less liable to the appearance of cuts or lines, which was too much the character of the former process. Fifteen ways in this manner worked close, will be sufficient to fill the ground, and give it a velvet-like tint. The former mode of making an outline from the painting, is now found to be wholly unnecessary, and the most ready and masterly method is to square the painting in any number of given squares, and the same number on the plate, agreeable to the size of it, and with a black-lead pencil draw backwards the picture (which with a little practice becomes familiar) on the ground, and the scraping is then performed by the original method. The art of mezzo-tinto engraving was considered formerly as only adapted to broad subjects, and where high minute finishing was required, it was thought vain to attempt it; but the great advances made in that art since the time of prince Rupert, have convinced every amateur to the contrary, and the successful works of Eadom, especially his masterly flower-pieces, are admirable specimens of its power, as also the ever grateful productions of Hodges, Dixon, and many rising artists of the present time. In engraving portraits, it is decidedly most appropriate for resembling both the touch and effect. This is the most usual way of performing this operation.

The art of scraping mezzo-tintos has been applied to the printing with a variety of colours, in order to produce the resemblance of paintings. The inventor of the method of doing this was J. C. Le Blon, a native of Francfort, and pupil of Carlo Marata, between the years 1720 and 1730. It was established by the inventor on this principle, that there are three primitive colours, of which all the rest may be composed, by mixing them in various proportions: that any two of these colours being mixed together, preserve their original power, and only produce a third colour, such as their compound must necessarily give; but if transparent colours be mixed, and three primitive kinds compounded together, they destroy each other, and produce black, or a tendency to it, in proportion to the equality or inequality of the mixture; and that, if, therefore, these three colours be laid, either separately, or upon each other, by three plates, engraved correspondently, on these principles, to the colouring of the design, the whole variety of teints necessary may be produced. The requisites, therefore, to the execution of any design in this method of printing, are as follow. 1. To settle a plan of the colouring to be imitated; shewing where the presence of each of the three simple colours is necessary, either in its pure state, or combined with some other, to produce the effect required; and to reduce this plan to a painted sketch of each, in which not only the proper outlines, but the degree of strength should be expressed. 2. To engrave three plates according to this plan, which may print each of the colours exactly, in the places where, and proportion in which, they are wanted. 3. To find three transparent substances, proper for printing with these three primitive colours. The manner in which Mr. Le Blon prepared the plates was as follows: the three plates of copper were first well fitted with respect to size and figure to each other, and grounded in the same manner as those designed for mezzo-tinto prints; and the exact place and boundary of each of the three primitive colours, conformably to the design, were sketched out on three papers, answering in dimensions to the plate. These sketches were then calked on the plates; and all the parts of each plate, that were not to convey the colour, to which it was appropriated, to the print, were entirely scraped away, as in forming the light of mezzo-tinto prints. The parts that were to convey the colour were then worked upon; and where the most light or diluted teints of the colour were to be, the grain in the ground was proportionably taken off; but where the full colour was required, it was left entire. In this regard was had, not only to the effects of the colour in its simple state, but to its combined operation, either in producing orange-colour, green, or purple, by its admixture with one alone; and likewise to its forming brown grey, and shade of different degree; by its co-operation with both the others. But though the greatest part of the engraving was performed in the mezzo-tinto manner, yet the graver was employed occasionally for strengthening the shades; and for correcting the outline, where it required great accuracy and steadiness. It was found necessary sometimes to have two separate plates for printing the same colour, in order to produce a stronger effect: but the second plate, which was used to print upon the first, was intended only to glaze and soften the colours in particular parts that might require it. With respect to the black and brown teints, which could not be so conveniently produced in a due degree, by the mixture of the colours, umber and black were likewise used.

With respect to the order in which the plates are to be applied, it may be proper to observe, that the colour which is least apparent in the picture should be laid on first; that which is betwixt the most and least apparent, next; and that which predominates, last; except where there may be occa-

sion for two plates, for the same colour, as was before mentioned; or where there is any required for adding browns and shades.

Mr. Le Blon applied this art to portraits, and shewed, by the specimens he produced, the possibility of its being brought, by farther improvements, to afford imitations of painting, which might have some value. It is nevertheless much better adapted to the simpler subjects, where there are fewer intermixtures of colours; and where the accuracy of the reflections, and demi-teints are not so essentially necessary to the truth of the design, from the greater latitude of form, and disposition of the colour, as in plants, anatomical figures, and some subjects of architecture. But perhaps plates engraved, or rather finished, with the tool, particularly with respect to the outline, would be better accommodated in some of these cases, than those prepared only by scraping.

Mr. Cochin remarks, at the end of an account he has given of Mr. Le Blon's manner, that though this ingenious artist confined this method principally to the use of three colours; yet should this invention be again taken up and cultivated, there would be more probability of success in using a greater variety: and that several different kinds might be printed by one plate; provided they were laid on in their respectively proper places, by printing balls, which should be used for that colour only. His hint might, however, be very greatly improved, by the further assistance of pencils, accommodated to the plates, for laying on the colours in the proper parts. — Handmaid to the Arts, vol. ii. p. 182, &c. Encyclopedie, Art. GRAVEUR en Couleurs, &c.

For the method of taking off mezzo-tinto prints in glass, see BACK-painting.

MEZZOVO, in *Geography*, a ridge of mountains in European Turkey, which divides Thessaly from Albania.

MGLIN, a town of Russia, in the government of Novgorod Sieverskoi, on the Iput. N. lat. $53^{\circ} 12'$. E. long. $32^{\circ} 34'$.

MHARAS, a mountain of Arabia, in the province of Yemen; 16 miles W. of Kataba.

MI, a river of China, which rises in the province of Chantong, and runs into the Chinese sea, N. lat. $37^{\circ} 12'$. E. long. $129^{\circ} 14'$.

MI, in *Musick*, the third found in the ascending scale of Guido's hexachords. See SOLMISATION, and HEXACHORD.

MIA, in *Geography*, a town of Japan, in the island of Niphon; 85 miles E. of Meaco.

MIACO. See MEACO.

MIADWZNA, a town of Poland, in the palatinate of Kiev; 36 miles S.S.E. of Bialacerkiev.

MIALNANAEN, a mountain of Scotland, in the county of Perth; 10 miles E.N.E. of George's Town.

MIAM, in *Commerce*, a weight for gold at Malacca, 320 mians being = 20 buncalls = a catty = 29oz. 17dwt. 16gr. English troy; and a money of account at Siam, 16 miams being = 4 ticals = a tale, and 20 tales = a catty; and as 10 mians are accounted = 1 Chinese tale, 5 tales of Siam = 8 Chinese tales.

MIAMAJA, in *Geography*, a town of Japan, on the N. coast of Niphon. N. lat. $41^{\circ} 10'$. E. long. 141° .

MIAMI, or MAWNEE, *Great*, a river of America, in the state of Ohio, forming the western boundary of the state, and dividing it from Indiana territory. It enters the Ohio, 333 miles below Marietta, according to the winding of the river. At its mouth it is 300 yards wide; but at the Pickawee towns, above 70 miles higher, it is not above 30 yards wide, though it is passable for loaded boats 50 miles higher. Its stream is rapid, without cataracts. This river has several boatable branches, one of which extends towards the Sandusky, with

an intermediate portage of six or eight miles, and another opens a communication with Au Glaze by a short portage. The channel of the river is stony; hence it is sometimes called *Affreniet*, or *Rocky river*. Its waters are very clear and transparent. One of the principal branches of the Miami river is called "Mad river," or "Pickawee fork." This is a pleasant stream, and passes through an agreeable level country of the greatest fertility.

MIAMI, *Little*, discharges itself, after a south-western course, into the Ohio, about 300 miles below Marietta. It is 70 miles in length, and at its mouth 70 miles wide. Its depth of water does not allow the passage of loaded boats. On its borders the land is good, and its banks are so high that it is seldom overflowed.

MIAMI of the *Lake*, sometimes called "Omec" and "Mannick," is a considerable stream, navigable with canoes to the portages which lead to the head of the Wabash, and through Au Glaze, one of its branches towards the head of Lorome's creek, a head water of the Great Miami. Its portage is three miles. This river falls into lake Erie, at the S.W. corner of the lake. On this river there is a village called Miami, near Miami fort.

MIAMIS, an Indian nation, which inhabit the vicinity of the Miami river, and the southern side of lake Michigan. These people can raise about 300 warriors. In consequence of lands ceded to the United States by the treaty of Greenville, Aug. 3d, 1795, government paid them a sum in hand, and engaged to pay them annually, for ever, to the value of 1000 dollars in goods.

MIANA, a town of Persia, in the province of Adirbeizan, where M. Thevenot the traveller died on his return from Ispahan; 45 miles S. of Ardebil. N lat. 37 12'. E. long. 47 22'.—Also, a town of Italy, in the Bellunese; 24 miles W.N.W. of Belluno.

MIAO-TSE' MOUNTAINEERS, a general name under which are comprehended several tribes, who differ from one another only by some particular customs. This half-barbarous people are dispersed throughout the Chinese provinces of Se-tchuen, Koei-teheou, Hou-quang, Quang-li, and on the frontiers of the province of Quang-tong. They often come down from their mountains, and make incursions into the flat, open country, although the Chinese, in order to restrain them, have built castles and fortresses in several places, in which numerous garrisons are maintained. The Miao-tse are under the government of princes, who have no less authority over their subjects than those of the "Lo-los" have over theirs; they maintain household officers and a regular militia; they have under them several petty feudatory lords, who, although sovereigns, are obliged to levy troops for them whenever they receive orders. The usual arms of the Miao-tse are bows and half-pikes. Their horses are much esteemed by the Chinese, on account of the agility with which they climb the mountains. The Miao-tse, who inhabit the province of Koei-teheou towards Liping-fou, have houses built of brick, containing only one story; in the lower part of which they keep their horses, oxen, cows, sheep, and hogs, which render their habitations very filthy and disgusting; and therefore the Tartar princes prefer lodging in the wretched barracks of the soldiers than in these houses. These Miao-tse are collected in villages, and live in great harmony with one another. They cultivate the earth, make cloth, and manufacture a kind of carpets, which serve to cover them during the night. Their cloth is only a coarse sort of muslin of little value; but their carpets are good, and well woven. The timber of their forests is purchased by the Chinese, and floated down the river that traverses their country; and the price consists of a certain num-

ber of cows, oxen, and buffaloes. The skins of these animals are used by the Miao-tse for breast plates, which they cover with thin lamina of steel or copper. The ordinary dress of these Miao-tse consists of a pair of drawers, and a kind of jacket which laps over their breast. Those of the Miao-tse tribe, who are dispersed in that part of Hou-quang which is nearest to the provinces of Quang-tong and Quang-si, are equally independent, though they seem to acknowledge the jurisdiction of the Chinese mandarins. They climb their rocks and run among their mountains barefooted, with great speed. The head-dress of their women is singular, as they place transversely upon their heads a board about a foot long, and five or six inches broad, over which they spread their hair, fixing it to the wood by means of wax. The greater part of the Miao-tse is composed of independent people; but some of them are subject to the Chinese government. Such are those who live towards the middle, and southern part of the province of Koei-teheou, and who are under two distinct governments. Some of these are subject to the mandarins of the province, and form a part of the Chinese people, whose customs they have adopted. The rest are subject to hereditary mandarins, who are considered as naturalized, although Chinese by extraction. These petty princes judge, in the first instance, the causes of their vassals, and have a right of punishing them, but not capitally. The Chinese entertain a sovereign contempt for the whole Miao-tse nation. Their account of them is very unfavourable; but the missionaries assure us, that they found them an active, laborious, and obliging people, and remarkably honest and punctual in restoring the baggage, and other effects which they had entrusted to their care. These mountaineers, on their part, no less detest the Chinese, whom they consider as harsh and severe masters, who, unable to subdue them, and reduce them to a state of slavery, keep them blocked up in their country, and cut off from all communication with their neighbours. In the year 1776 these mountaineers were driven into their inmost retreats, and totally subdued by Akoui, a Chinese general. Grosier's China, vol. i.

MIASMA (from *μαζια*, the most direct interpretation of which is to *daub*) may be applied to any kind of impurity. Among medical writers, however, to whom the word is now chiefly confined, it relates principally to impurities in the air, and is sometimes used indiscriminately with *Contagion* or *Infection*; which see. Under the former article we felt disposed to adopt Dr. Wilson's distinction between contagion and infection, *viz.* that the first should express a morbid poison, the application of which may excite disease, and the latter the condition of the subject after the morbid poison has induced such an effect.

This definition has the advantage of being consistent with the etymology of the two words, particularly of the latter, the allusion of which is to dyeing or staining: for as a colouring substance may come into contact with another, under such circumstances as to leave no stain, so a subject may be sometimes exposed to a contagion without being infected.

The variety of effects induced by different impurities of the air, renders it absolutely necessary to discriminate them with as much accuracy as possible. We shall, therefore, confine the term *miasma* to its original meaning, as used by Hippocrates, and, as all the rest have appropriate terms, we shall defer them to the articles in their order, namely, **MORBID Poisons, PLAGUE, QUARANTINE, and TYPHUS.**

The father of physic remarks, that there are three great causes of disease, food, drink, and air. The latter, he continues, is by far the most important, because we eat and drink only, at certain times, and can even subsist for a few days without

without either, but are perpetually breathing, and cannot exist without air but for a few seconds. His dissertation on this subject relates principally to the temperature of the atmosphere, the aspect of places, according to the neighbouring mountains and seas, the various seasons of the year, climates, and manners of the inhabitants. Consequently but little information can be derived from him, concerning those most deleterious properties in some particular districts, which never could be visited but through the enterprising spirit of modern navigators. As this subject is now become particularly interesting, not only on account of our commercial connections, but from the importance of preserving the lives of our army and fleet, we shall not scruple to dwell upon it with some minuteness.

Though miasmata may be of different kinds, yet as they are only known by their effects on the human body, and the sources from which they are derived, we cannot venture to offer any other distinction. This distinction will be principally in degree, for, as Dr. Cullen remarks, the source seems to be universally from marshes, or moist ground acted on by heat. The properties of marshy soils in England is pretty generally understood, and their effects on the human body. We shall, therefore, only in general remark, that the ague induced by them is for the most part milder in spring than in autumn, and that for some time before and after the solstices, these places may be visited even by strangers with impunity. That all new comers are more certainly, and for the most part with more violence, affected than the constant residents; and that, from causes hitherto unknown, the disease is more general, more severe, and more fatal in some years than in others.

All these, however, like other pathological facts, must be admitted with certain limitations. The vernal agues, though so generally mild as to be formerly considered wholesome visitations to the constitution at that season, are sometimes severe; and the autumnal have in some seasons been found mild. There are constitutions which can never be injured to this kind of air, but are constantly and severely affected on each returning autumn; and there are new comers who remain with impunity till a severe season affects them, and probably many of the natives. At these times the season has been known to be protracted from the vernal almost to the autumnal period, and not to cease till winter has set in.

In England the intermittent fever is no longer an object of terror, since the introduction of the bark, and the safe use of some most powerful remedies; but most of all in proportion as the sources of the miasma have been diminished by the draining and improved cultivation of the soil. In Sydenham's time ague was among the epidemics of the metropolis, and the bills of mortality of those days shew how frequently it proved fatal. When London is now visited by ague, it is for the most part only sporadic, and in many instances, where it is least suspected, will be found to have been contracted by a residence in the country; for we shall presently have occasion to shew that miasma, received into the constitution, shews its effects at very uncertain, and sometimes very distant periods. There are, however, seasons when ague attacks those who have never left the town, probably by the air wafted from the marshes, in which cases the miasma is so diluted as to affect those only who are particularly susceptible. The years 1765, 1766, as well as 1782, are particularly marked as ague years in London, and even in 1808, the disease very often shewed itself. During each of these seasons a long prevalence of easterly winds was remarked. This, however, is too common an event during the summer and autumn to be considered a sufficient cause

of itself. The truth is, the season was particularly sickly to the inhabitants of the low lands on the eastern side of the metropolis: and so powerful was the effect of the miasma at its source, that instead of the usual mild and regular intermittent, remittent and even continued fevers were very frequent and very fatal.

In the Netherlands the dreadful effects of this miasma have been too recently experienced to require, at this time, any considerable commentary. One might suppose such events would never be entirely forgotten, were it not that so many records are preserved, which appear to have been overlooked before the last unfortunate expedition to Walcheren. Not to mention the account given by sir John Pringle, whose medical character and long practice in the army have rendered him an oracle in these enquiries, we shall transcribe part of Dr. Wind's observations, who with his father had practised at Middleburgh for nearly 30 years.

"Towards the end of August, or beginning of September," says he, "is a continual burning fever, attended with a vomiting of bile, which is called the gall-sickness.—Foreigners in indigent circumstances, who are garrisoned in the adjacent places, are apt, after these fevers, to become dropical, and many die." Dr. Lind, to whom we are indebted for the above extracts, further remarks, "the Scotch regiment in the Dutch service at Sluys has been known to bury their whole number in three years." Lind on Climates.

The insalubrity of the lower parts of Hungary, and still more of the Campania of Rome, are too well known to require our particular notice. We cannot, however, omit the history preserved by Lancisius, physician to pope Clement XI. "Thirty Romans of distinction of both sexes, having made an excursion upon a party of pleasure towards the mouth of the Tyber, the wind suddenly shifted and blew from the south over the putrid marshes, when twenty-nine were seized with tertian fever, only one escaping."

Though Africa has something terrific in its sound, yet it seems probable, that the northern coast, and for a considerable way inward, if we except the Lower Egypt, is as healthy as any part of the world. But the southern coasts, and particularly as we advance inward along the rivers, are so destructive to European constitutions, that probably neither our love of novelty, nor enterprising temper, will ever be sufficient to overcome these difficulties, so as to form a permanent settlement. In all these places the first rains are found so certainly deleterious, even to the natives, that they endeavour at these times to confine themselves to their houses, and to shut out as much as possible the external air. After a time, though the rain continues, the miasma is less pestilential, but soon after its cessation, as the surface of the ground becomes drier from its exposure to an almost vertical sun, the exhalations are pregnant with the exciting causes of all the tropical diseases.

In the countries leading from Africa to Asia, particularly Bassora, and other parts about Arabia, the English find the climate healthy, excepting at certain well-marked seasons.

Of the four presidencies in the East Indies, that of Bencoolen, in the island of Sumatra, is found the most unhealthy. Bengal, however, at certain seasons, is scarcely less fatal to the British, and often even to the Asiatic inhabitants. In the year 1762, it was well ascertained that 30,000 blacks and 800 Europeans died of the fevers of that country during the sickly season. Bombay has been rendered more healthy since an embankment, by which the overflowing of the sea has been prevented; and Madras has generally been considered a station not unfavourable to British constitutions.

Of all the unhealthy spots in Asia, Batavia is pretty generally allowed to be the worst. The fatal mistake, too common among Europeans, of attempting to assimilate the customs of a new country to their own, is said very much to have increased the infalubrity of that settlement. It seems hardly consistent with common understanding, that the Dutch, after the experience of so many years, should still persevere in preserving their dykes, to lessen the expence of carriage at the charge of human life. Yet such we are assured is the case. Among the many instances of mortality, for which that colony is so well known, we shall mention only two. In the year 1763, the *Falmouth*, a ship of 50 guns, was at Batavia for about six months, during which time she buried 75 of her crew, and 100 soldiers of the 79th, who had embarked on board her; every soul on board having been seized with fever, excepting only the captain. In the year 1764, the *Panther*, during a very short stay, buried 25 of her men, among whom was the commander, captain Matthewson. Nor was the sickness confined to the ship's company. The whole city exhibited no other scene but disease and death. Streets crowded with funerals, bells tolling from morning till night, and horses jaded with dragging hearses to the burial places.

Though we have remarked above the great probability that the nature of this miasma is every where the same, as its sources are evidently similar, yet it is right to observe that its effects on the human body are somewhat diversified in different quarters of the globe. Throughout the whole of Hindoustan, and northward, as far as the British have formed any settlements, the liver seems to be principally affected, and the principal danger to arise from the too high action of its vessels, and even the entire disorganization of that important viscus.

On the southern coast of Africa, and along the margins of its extensive rivers, the liver is the organ principally affected, and rarely, if ever, recovers its due functions, where the injury has been considerable. The liver suffers in the tropical regions of the West, though not with the same uniformity. In the southern parts of the N. western hemisphere, and in all the West India islands, the liver is often affected, but in many instances of the most violent fevers in this part of the world, it may be doubted whether the stomach is not primarily affected, and the liver only sympathetically, the black vomit being now pretty generally admitted to be derived from the stomach, and the yellow colour of the skin not making an essential character of the fever known by that name. It is not improbable that the Zealand disease, though distinguished by the name of the gall-sickness, may only affect the liver in common with the other viscera. It is certain that the brain suffers much in this disease, and not uncommonly those who escape with life remain for months, and sometimes years, with impaired memory and even degraded intellect.

In England, the enlargement of the spleen is the most common effect; the consequences of which are very rarely considerable, if the disease is not suffered to remain long without relief.

The most important consideration, and the most to our present purpose, is the means of preventing the existence of miasma, or, where that cannot be done, of avoiding its effects. The first, it is evident, can only be accomplished by draining the low grounds. This may always be attained where the surface is above the level of the sea, or still easier, if above the level of a neighbouring river. What has been done in this way in our island is hardly credible. The attempts to drain the Pontine marshes are not less honourable to

human industry; and if we can believe the present accounts, it would appear that such attempts are now persevered in with more steadiness than ever. The vast embankments made by cardinal Richelieu on the coast of Rochelle, in the bay of Biscay, are well known, and must for ever live in the writings of Voltaire. When, as is often the case, a town has been constructed on a hill by the banks of a river, if the population, after spreading along the side of the river, should gradually extend itself over the back of the hill, at right angles with the river or the sea-coast, there will always be danger of water stagnating in the valley behind. The force of the miasma from this cause will be greatly increased by the illuvis from the cottages which usually are the first erections at these extremities. To this London at one time owed, if not its agues, at least its vernal and autumnal fevers, as described by Sydenham. The great fire proved the means of forming a proper level as far as that formidable, though fortunate event extended; but it was not till within these last thirty years, that the northern part of the city, or rather its suburbs, has been drained by a sewer, which, if ever London should share the fate of Carthage, will immortalize the well-directed industry and enterprize of its inhabitants. This sewer, which is cylindrical, not less than six feet in diameter, and in some parts more than twenty feet below the surface, was carried through some of the narrowest streets, considerably below the foundations of the houses; to protect which, such a quantity of timber and planks was buried as would form almost an impassable grove if it were all to appear above ground. The sudden growth of the cities in North America has produced the most fatal effects in proportion as the heat of the solstitial and autumnal sun is greater, and as the increase of their towns has outrun most others in every part of the world. This is now so well understood, that the more prudent inhabitants of the large towns are attending much more to securing themselves from yellow fever by draining, than by the enforcement of quarantines.

In our own country it is incredible to what extent the spirit of draining has extended; besides those large undertakings which can only be brought about by the union of whole counties. Sometimes assisted, or at least empowered, by parliamentary authority, every enterprising farmer, whose lands are of any extent, has his *underground drain* wherever it is necessary, and can be accomplished.

We are not, however, to consider all the danger as removed when an old morass is drained: for even if such land is secured from being overflowed under the most unfavourable seasons, which is rarely the case, yet whenever it is first converted from pasture to arable, fevers are in some places excited much more formidable than the common intermittent. This leads us to the second consideration, that of avoiding the effects of miasma where the cause cannot be entirely removed.

The first part of the inquiry here must be, whether the disease is infectious? If we reason from cause to effect, we should conceive that a disease derived from exhalations from the earth could only be excited by a similar cause, and, consequently, that a sick person removed from the source could convey no contagion to others. But we should recollect that he may arrive with his clothes so impregnated with the effluvia of such miasma, as to be dangerous to those who first receive him, as we find persons often carry with them the smell of their particular occupation or habits. To determine, therefore, that a disease is contagious, it will be necessary to prove that others have been infected who have been exposed to the sick only, and neither to the feet of the

miasma itself, nor to such substances as may contain what is called the fomes.

At the source of the disease we shall find the greatest difficulty in determining the question; for where one general cause affects several, it will often be difficult to say whether an attendant on the sick has taken the disease from them, or from the same common cause that has affected the whole neighbourhood. This difficulty we shall see is much increased when we come to the article *TYPHUS*. At present, we shall only make two general remarks:

First, that wherever a number of persons are collected, if sickness of any kind prevails among them, a kind of infectious air is generated, which is the source of typhus fever.

Secondly; that during the prevalence of any epidemic, those who are affected with any other disease are generally the earliest seized with the epidemic, their reduced state of health rendering them less able to resist the force of the miasma; and as two diseases cannot occupy the same constitution at the same time, the consequence must often be, that their former complaint gives way to the reigning disease.

It may seem remarkable that this chain of events should be more accurately attended to by the ancient historians than by modern physicians; but the terms in which they explain themselves may shew the cause of this difference. Thucydides makes no mention of contagion till the advanced period of the plague in Athens; and Livy expressly says, that at first the men became sick from the badness of the season, and the unhealthiness of the place, and that afterwards the attendance on the sick rendered disease more common. By this evidently marking, that the accumulation of the sick had induced the hospital, in addition to the endemic, fever. See *CONTAGION*.

We have been obliged to anticipate this part of a succeeding article, because it involves a question of the highest importance, in avoiding the *effects* of miasmata where the *cause* cannot be entirely removed. If the disease induced by such a cause had a contagious property similar to small-pox and measles (see Dr. Cleghorn on the Diseases of Minorca), the probability is, that it would not cease till it has invaded all who are exposed to it; and that should any leave the country with the disease, or its fomes, the consequences would be equally general in every place to which the sick should be carried. In this case the only remedy would be to confine the sick and healthy to the spot, and not suffer them to escape till the disease has entirely ceased; after which there should be an universal ablution and purification before any general intercourse should take place. But if the disease is known to arise only from the season and the nature of the country; if from experience it should be ascertained that with a change of season the disease will cease; if it is further found by experience that no infection can be traced till the number and accumulation of the sick has produced a hospital or camp fever; if all this can be ascertained, surely the first step should be to encourage all the inhabitants instantly to quit so fatal a spot, and not to return to it till a change of season has produced a change in the properties of the atmosphere. It is much to be regretted that this discrimination has been so little attended to in the late controversies concerning the yellow fever in the West Indies, as well as the epidemics, which have visited Gibraltar and the various cities in the south of Spain. In America the question seems to be unfolding itself; and, as we before remarked, the terror of contagion is gradually giving way to a more rational precaution.

Where a country has been drained, after the ploughing of which the exhalations are found deleterious, no remedy remains but to confine this branch of husbandry to the solstices, afterwards leaving the broken ground to the effects of air and rain. This caution should be extended to the opening of new land wherever the surface is formed of an accumulation of autumnal leaves impeding the current of rain, and annually putrifying for a considerable number of years.

When vessels are cruising, or moored in the neighbourhood of swamps or thick woods, particularly in tropical regions and at dangerous seasons, the sailors should never be allowed to sleep on deck, and as few as possible should remain there after sun-set. If it is necessary to wood or water, every endeavour should be used to employ for this purpose the aborigines of the place, or negroes, whose constitutions are seldom affected by such miasmata, and when they are, the effect rarely exceeds that of the common tertian, which readily gives way to the usual remedies. If it is absolutely necessary to send the crew on shore, they should always return before sun-set and sleep on board.

When, as is often the case, it is found necessary to conduct a siege on one of these unwholesome spots, the first consideration should be to commence the operations at the least dangerous season. At this time the greatest attention should be paid to raising batteries as high as possible, consistently with the safety of the besieged, the miasma being always found to be most powerful the nearer to the soil. At the same time the level of the ground should be examined, to see how far it will admit of draining without turning up too much of the surface. When the sickly season arrives, as few men as the service will permit should be left on the ground during night, who, on the succeeding morning, and for several days after, should be carefully examined by the medical officer, that the first approaches of disease may be instantly met. Such men as are found best to withstand the effects of the miasma should be oftenest on duty. Above all, the hospitals should be prepared before they are wanted, and in a situation as remote as possible from the source of disease. Where the situation of the place will admit, it would be best to use floating hospitals, or hospital-ships, which in fair weather might make frequent cruises with their port-holes and scuteheons open, and with as many of the men on deck as can be moved thither. The attendants should be selected among the convalescents.

By attention to these rules, many expeditions might be much more successful, and much less wasteful of human life: many lands might be cultivated by those who would enjoy the benefit of their bold and enterprising undertaking, and many lives rendered comfortable which at this time are dragged on with misery and resigned without regret. See *EPIDEMIC; FEVER, Causes of; HEALTH, &c.*

MIATA, in *Geography*, one of the Society islands in the S. Pacific ocean. S. lat. 7° 52'. W. long. 148° 6'.

MIA-TAU, a cluster of small islands in the Chinese sea, near the coast of Chang-tong; extending from six to 36 miles N. of Tong-tcheou.

MIATHIR, a town of Morocco, in the province of Duquella, near a mountain of the same name.

MIAU-SHEHR, a town of Persia, in the province of Ghilan; 50 miles N.W. of Reshd.

MICA, *Glimmer*, Wern.; *Mica*, Haüy.

The usual colour of this mineral is grey, which occurs yellowish, greenish, smoke, and ash-grey; the yellowish-grey passes into yellowish and greenish-white, and into silvery, and also into wax-yellow, brassy and gold-yellow, reddish, pinchbeck,

pinchbeck, and blackish-brown; the greenish-grey passes into mountain and asparagus-green, also into leek-green and blackish-green; the ash-grey is found of various shades, and passes into perfect black. Sometimes several colours occur together in the same piece. Upon the whole the colour is found considerably to vary, according to the different degrees of transparency of the specimen. The black variety appears brown, when placed between the eye and the light. The colour of the powder is always greyish-white.

Mica is found principally disseminated and in thin layers alternating with other fossils, such as quartz and feldspar, in gneiss, &c; but it also frequently occurs in mats and crystallized.

Its primitive form is the short, straight, rhomboidal prism of 120 and 60°. Integrant molecule the same.

The principal crystallizations are; 1. The short straight four-sided prism with rhomboidal planes; being the primitive form (*Mica primitif*, Haüy, pl. 60, fig. 205.) These prisms are generally so low, that they may be considered as four-sided tables. They are easily and distinctly divided in a direction parallel to the bases; the cleavage in the other direction is generally indistinct.

2. The regular six-sided prism, generally very low, so as to appear tabular. (*Mica prismatique*, Haüy, ib. fig. 207.)

3. The lengthened rectangular table (*Mica binaire*, Haüy, ib. fig. 208.)

4. The low regular six-sided prism with truncated terminal edges. (*Mica annulaire*, Haüy, ib. 206.)

The crystals are sometimes large, but generally middle-sized and small; they are sometimes found separate, but oftener grown together; they are now and then seen fascicularly aggregated and in roses. The lateral planes of the crystals are smooth and splendid; the terminal planes shining. Internally specular splendid; lustre sometimes resinous, sometimes pearly, often semi-metallic and metallic; in the uncrystallized mica, the lustre of the planes of fracture is generally less intense.

Fracture partly straight, oftener curved, or undulatingly foliated. The foliated fracture sometimes passes into the broad and narrow radiated, which is partly parallel, partly fascicularly or stellularly diverging. The fractural surface, particularly that of the broad radiated variety, is sometimes marked with feather-like streaks. Fragments tabular. The massive shews coarse, large and small-grained distinct concretions; the radiated is composed of cuneiform columnar concretions.

The common massive varieties of mica are opaque, or only translucent on the edges; the detached folia are mostly translucent and even transparent. Some crystallized varieties are perfectly transparent in all directions. The separation of the folia from each other, though not observable to the eye, is generally the cause of the loss of transparency.

It is semi-hard, approaching to soft; easily divisible in the direction of the folia, and may be easily cut with a knife; it feels smooth, not unctuous, and is elastic flexible. Specific gravity 2.654—2.634, Haüy; 2.726, Karst; 2.767, Kirw.; 2.866, Reufs; 2.934, Blumenb.

Before the blowpipe, the dark coloured varieties (according to Wiedenmann) take a pinchbeck or brass-yellow hue, but they are nearly as difficultly fusible into enamel as the colourless varieties. The enamel of black coloured mica affects the magnetic needle.

The analyses which we possess of this substance vary considerably, at least with respect to the relative quantity of the constituent parts of the several varieties.

	Muscovy Glas.	Common.	From Zinnwald.	Muscovy Glas.	Black Siber
Silica	40	50.	47.	48.	42.50
Argil	46	35.	20.	34.25	11.50
Magnesia	5	1.35			9.
Oxyl of iron	9	7.0	15.50	4.50	22.
Manganese			1.75	0.50	2.
Lime		1.33			
Potash			13.50	8.75	10.
Loss		5.32	2.25	4.	3.
	100	100	100	100	100
	Bergm.	Vauq.	Vauq.	Klapr.	Klapr.

This very common but remarkable fossil, forms a principal ingredient of some of those rocks which belong to the primitive slate formation of Werner, particularly granite, gneiss, and mica slate: it is also found in primitive limestone, and in-grau-wacke. Nor is it wanting in the trapp-formation, as in sienite, porphyry, greenstone, basalt, wacke; though in the last mentioned rocks it is probably derived from primitive rocks by disintegration. In some cases it is known to form entire beds, like those at Zinnwald. It rarely occurs in veins, such as those belonging to the tin-lone formation in Bohemia and Saxony.

The localities of mica being those of the widely extended primitive rocks above-mentioned, need not to be particularised. The mica in large plates, called Muscovy glass, from the use to which it is applied, occurs in granite in several parts of Siberia, and on the shores of the Caspian, at Uda, on the borders of the Upper Tunguska, the lake Jenesej, Baikal, in Georgia, &c.

By far the greatest part of the large foliated mica is employed in the Russian empire, especially in Siberia, where it is generally used instead of glass for windows. The poorer classes employ the small plates, which they sew together. It is said to have been a substitute for glass in the windows of Russian men of war, as being less liable to be broken by the concussion of the air during the discharge of heavy artillery; but to this use mica is no longer applied. We find that in the year 1781, upwards of 200 pud of this variety of mica were exported from Peterburg to Lubeck, and 2721 pud to Great Britain. Beckmann, who makes mention of this exportation, is at a loss to guess the use in which these 116,800 pounds of Muscovy glass may have been employed.

According to Ellis's account, the same kind of mica occurs in large plates in Hudfon's bay; and Kalm found it in Pennsylvania, in leaves of half a yard in diameter, and of equal transparency with the Siberian variety. Indeed the Swedes, who from 1630 to 1655 had colonies in New Jersey and Pennsylvania, employed it, as the Russians do, instead of glass in the windows.

The tenuity of the laminæ of the large foliated varieties is such, that, according to Haüy's calculation, a piece $\frac{1}{4}$ ths of a line in thickness, may be divided into 23,255 separate laminæ. This property, and the facility with which it is cut, render the Muscovy glass peculiarly proper for inclosing minute objects to be viewed by the microscope.

MICA-slate, *Glimmer-schiefer*, Werner; *Micaceous schist*, Kirwan; *Schiste micacé*, Broch.

This primitive rock is essentially composed of mica and quartz, disposed in layers, which are more distinct than those of gneiss, into which it is frequently seen to form a transition. The colour of the mica, which generally forms the

predominant part, is usually of a grey colour, mixed with greenish; the quartz is almost always white.

This rock, which is of great importance to the miner, as being particularly rich in ores, contains also frequently other minerals, particularly common and noble garnets, which may even be considered as forming an essential component part of mica slate; shorl, both the common and tourmaline (such as that of Dunkeld and Blair-in-Athol in Scotland), kyanite (which has been found in the varieties from Mainland, one of the Shetland islands, and near Banchoory in Aberdeenshire), rutile (that of Salzburg, Hungary, &c.), feldspar, but only in single grains.

Besides the common mica slate, which is straight, and rather thick flaty, the Wernerian geognostians distinguish three other varieties, *viz.* the undulated mica slate, which has not been found to include other substances; the talcky mica slate, which is straight flaty, composed of green mica, and traversed by thick layers of quartz; and lastly, the fine flaty variety, which forms a transition into clay slate, which rests on it; it is generally of a greyish-yellow colour, and almost entirely unmixed with quartz.

As mica slate passes on one side into clay slate, (the next rock in succession,) in the same manner it forms a very distinct transition into gneiss, on which it rests; the outgoings of its strata being lower than those of the latter, and higher than those of the clay slate, which usually cover them. It surrounds the older rocks in mantle-shaped stratification.

The mica slate mountains, which are generally much less craggy and bold than those of gneiss, contain far more foreign beds than both granite and gneiss mountains; the most remarkable beds observed in them are those of granular limestone, of hornblende slate, hornblende rock, and actinote; as likewise galena, copper and iron pyrites, magnetic iron-stone, and other ores. The greatest part of the metaliferous mines of Sweden and Norway, and several of those of Hungary and Saxony, are situated in this rock.

Mica slate constitutes considerable mountains in most parts of Europe, and also, according to Humboldt, in South America. In Scotland, it occurs abundantly in the valley between Dunkeld and Blair-in-Athol, on the mountain of Schehallion, in the island of Arran, the island of Jura and Isla, &c. Jameson.

It is often employed for constructing or lining furnaces, whence it has been called *Gestellstein*, or *Saxum fornacum*; names which are, however, given to several other fossil rocks applied to the same purpose.

MICABA, in *Geography*, a town of Japan, in the island of Nippon; 100 miles N.N.E. of Meaco.

MICAH, in *Scripture History*, the seventh in order of the twelve minor prophets. He is called the "Morasthite," or of "Morefa," a village near the city of Eleutheropolis, in the south of Judah. He was nearly contemporary with Isaiah, and has some expressions in common with him: compare Isaiah, ii. 12. with Micah, iv. 1; and Isaiah, xii. 15. with Micah, iv. 13. St. Jerom says, that Micah was buried at Morasthi, and Sozomen says, that his tomb was discovered to Zebennus, bishop of Eleutheropolis, in the reign of Theodosius the Great. Some have confounded Micah with Micajah, son of Imlah, who was of Ephraim, and who prophesied in the time of king Ahab. Micah prophesied under Jotham, Ahaz, and Hezekiah for about 56 years, from the beginning of the reign of Jotham, or 754 B.C., to the last year of Hezekiah 698 B.C. His prophecy contains seven chapters; in which the first foretells the calamities of Samaria; afterwards he prophesies against Judah, and having exclaimed against the iniquities of Samaria, he foretells the

captivity of the 10 tribes, and their return. After a pathetic invective against the princes of the house of Jacob, and the judges of the house of Israel, he speaks of the birth and reign of the Messiah. The two last chapters contain an invective against the iniquities of Samaria; after which he predicts the fall of Babylon, the re-establishment of Israel, their happiness, &c. in such lofty terms, as chiefly agree with the state of the Christian church. The style of Micah is for the most part close, forcible, pointed, and concise; sometimes approaching the obscurity of Hosea; in many parts animated and sublime, and in general truly poetical.

MICARELLE, in *Mineralogy*. See PINITE.

MICE, in *Gardening*, a sort of vermin which are highly destructive to several sorts of garden crops, such as peas, beans, &c. in the early spring, and lettuces, melons, and cucumbers in frames in the winter season. When discovered they should of course be immediately destroyed, either by traps or some other means. See VERMIN.

The author of "Phytologia" has suggested, that "the destruction of grain after it is sown by field-mice, which mine their way very quickly under newly ploughed lands near the surface, is supposed by Mr. Wagstaff, in the papers of the Bath Society, to be effected in some seasons to a very great extent. And that the tussocks of wheat, seen to arise in many fields, are owing to the granaries of these diminutive animals, which he has found to contain nearly a hatful of corn, which grows into a tuft, if the owner becomes accidentally destroyed. It is also further asserted, that they feed much on the young plants, as they arise from the seed, and multiply at that time very fast. He detects their habitations by small mounds of earth being thrown up, on or near the apertures of their dwellings, or of the passages which lead to their nests or granaries; and by following the course of these passages, he found and destroyed the parents and the progeny." He likewise "recommends the taking up and dividing the tussocks of wheat, thus sown in the autumn by the field-mice, and transplanting them in the spring; and also to thin other parts of a young crop, as they appear too thickly sown, which he esteems an advantageous practice."

And it is found, that "acorns when sown, as well as garden beans, and peas, are liable to be dug up or devoured by these voracious little animals, which may be destroyed by traps baited with cheese; or best of all, by the encouragement of the breed of owls, so active in the pursuit of nocturnal vermin, and thence so useful to the gardener and farmer, who still permit their servants and children to destroy both their eggs and callow young."

These little plunderers may be readily destroyed by the use of the poisonous substance, usually known by the title of *nux vomica*, which should be finely rasped down, and mixed with some sort of meal or other similar material, of which they are fond.

MICELLA, in *Geography*, one of the smaller Molucca islands.

MICHAEL I., in *Biography*, surnamed *Rhangabe*, emperor of the East, was son of Theophylact, governor of the isles, and married Procopia, daughter of the emperor Nicephorus I., by whom he was raised to the office of great master of the palace. He was present at the battle against the Bulgarians, in which Nicephorus was slain A.D. 811. Stauracius, the son of the emperor, had received a severe wound in the battle, and was, besides, universally hated. The empire was therefore offered to Michael, who at first hesitated to accept it, but finding that Stauracius designed to put out his eyes, he obliged him to retire to a convent,

where

where he soon after died. Michael was possessed of private virtues, but wanted vigour to control the spirit of his wife, who excited the indignation of the soldiers, by appearing at the head of the army, and it was generally acknowledged that he was deficient in the military talent requisite at such a crisis. He marched against the Bulgarians, ventured upon an engagement, in which he was defeated, and returned with disgrace to Constantinople, leaving a discontented army under the command of dissipated generals. By their intrigues the soldiery proceeded to the deposition of Michael, and offered the imperial crown to Leo the Armenian. The senate, the clergy, and the people of the capital still adhered to Michael, but he declared that not a drop of blood should be shed on his account, and resigning the ensigns of sovereignty retired with his family to a monastery, having filled the throne less than two years. He was permitted to live in peace, and in a religious retreat, during thirty-two years, which he survived his abdication. Gibbon. Univer. Hist.

MICHAEL II., surnamed the *Stammerer*, a native of Phrygia, was educated among the Jews and heretical Christians, and during the early period of his life, he adopted opinions that probably rendered him obnoxious among those who styled themselves of the orthodox faith. When he attained to years of discretion he was appointed an officer under Nicephorus, and was a principal instrument in raising to the throne Leo the Armenian. During the reign of this emperor he was employed in high offices, but having incurred the suspicion of conspiring against his sovereign, he was arrested and brought to trial. At that period, conviction and accusation followed each other of course, and Michael was condemned to the cruel death of being burnt in the furnace of the private baths. The execution of this sentence, which had been fixed for Christmas-day, was suspended through devout scruples of the empress, and in the mean time Michael informed his friends of his danger, and threatened them with detection, unless they effected his deliverance. The hope of self-preservation excited them to exertion, and in consequence of it, Leo was dethroned and murdered, but Michael with fetters on his legs was seated on the imperial throne in December 820. One of his first acts was to reverse the late sovereign's decrees, by recalling a number of bishops and other ecclesiastics who had been banished, for refusing to comply with the late emperor's edict against the worship of images. Notwithstanding this conduct, Michael himself was by no means friendly to this kind of worship, and tolerated it only without the precincts of the capital. He is therefore reckoned among the enemies of the Catholic church, and the calamities of his reign have been imputed to his heresy. A revolt in the Asiatic provinces was the commencement of a civil war, which nearly subverted the throne. One Thomas, at the head of a vast army of barbarians, over-ran Lesser Asia and Syria, defeated the troops sent against him, and laid siege to Constantinople. At length, however, he was unsuccessful in his efforts against the established power, and falling into the emperor's hand, he was put to a cruel death. During these internal commotions, the Saracens landed in Crete, and formed a settlement in that island, from which Michael in vain attempted to expel them. During the sixth year of his reign he married, from a convent, Euphrosyne, the daughter of Constantine VI., which has been imputed to him as a most irreligious act; it succeeded likewise as an example to one of his officers, Euphemius, to gratify a licentious passion, by forcibly taking a nun from her convent in Sicily, which was the cause of the loss of that island. Euphemius, in order to avoid punishment, fled to the Saracens in Africa,

and returning with a large body of troops of that nation, endeavoured to gain possession of Syracuse. He lost his life in the attempt; but the Saracens, thus introduced into Sicily, by degrees made themselves masters of it, as well as of the neighbouring provinces of Italy. Michael, after an unfortunate reign of nearly nine years, died in 829, and was succeeded by his son Theophilus.

MICHAEL III., grandson of the preceding, was born in 836, and succeeded his father Theophilus in 842, when he was only six years of age. He had been educated in habits of piety and virtue by his mother Theodora, but as he grew up, he abandoned all the early impressions of his childish years, became famous for the dissolute course of his life, and deservedly obtained a place among the most unworthy emperors. He did not assume the reins of government till he was in his twentieth year, when Theodora and her daughters were obliged to quit the court and enter a monastery, where she soon died of a broken heart. Michael seemed to rejoice in the event; while his virtuous mother was alive, her conduct was probably some restraint to his passions, but as soon as death had levelled her with the dust, her worthless son was anxious to surpass even a Nero in his profligacy and buffoonery. In imitation of that prince, whose name and memory are devoted to infamy, he pursued the sports of the circus, and took into his favour and confidence those who were deemed the most skilful charioteers. He was perpetually guilty of excess in wine, and, in the hours of his brutal intoxication, issued the most sanguinary commands, which his servants, more humane than their master, frequently ventured to disobey. It was one of his amusements to profane with mock solemnities the most sacred ordinances of religion. Amidst these follies he undertook an expedition to the Euphrates against the Saracens, who put him and his army to flight. He was long under the influence of Bardas, whom he raised to the dignity of Cæsar, and by whose advice the patriarch Ignatius was deposed and imprisoned, and the learned Photius placed in his chair. In 866, Michael was induced by Bardas to undertake an expedition into Crete, to oppose the ravages of the Saracens, who from that island had made a descent into Thrace. This advice proved fatal to the favourite and minister, for having excited the jealousy of the emperor, he ordered him to be stabbed in the tent of audience. This cruel and treacherous deed excited the indignation of the soldiers, and Michael returned privately to Constantinople, where he soon after raised Basil the Macedonian, who had been the instrument in the assassination of Bardas, to a partnership with him in the throne, and devolved upon him all the business of the state. Basil, who it is said, had just ideas of the imperial character and duties, endeavoured by remonstrances to reclaim Michael from his abandoned course of conduct. But his habits were too deeply rooted to admit of a change, and it was determined to ruin the monitor. Basil was fortunately apprized of his danger, and resolved to strike the first blow, and with the aid of accomplices murdered him while asleep, and in a state of intoxication, in the year 867, in the thirty-first year of his age. Univer. Hist. Gibbon.

MICHAEL IV., a native of Paphlagonia, of obscure birth, was brought up to the trade of a money-changer, but being introduced at the court of Romanus III., his personal beauty caught the eye of the licentious empress Zoe, who made him her chamberlain, and exacted from him attentions inconsistent with the homage which he owed to his sovereign. At length the empress, advancing from one degree of guilt to another, poisoned her husband, celebrated her nuptials with Michael, and raised him to a partnership in the throne.

This event was accomplished in the year 1034. The empress was disappointed in the expectations which her passions had excited, as well on account of the ill state of health which her husband fell into, as on account of the torture which he experienced from a consciousness of the crimes in which he had participated. All authority soon devolved into the hands of his brother John, an eunuch, who had originally introduced him to court, and who quickly reduced Zoe to a state of insignificance, surrounded with spies, and made a prisoner in her own palace. Michael began now to endeavour to atone for his guilt by liberality to the poor, and by the endowment of churches and hospitals. A revolt of the Bulgarians roused him to exertion; he headed his army, and though in his first expedition he was obliged to retreat with disgrace, in a second encounter he was more successful, and returned in triumph to Constantinople. Warned with the approach of death, he retired to a monastery, which he had himself founded, and in which he died, in the year 1041: having first nominated as a successor his sister's son,

MICHAEL V., furnamed *Calaphates*, from his father's occupation of a caulker of ships. He was proclaimed emperor immediately on the death of his uncle, but his reign was of very short duration. His first sovereign decrees were the banishment of his uncle John, the eunuch, and the confinement of Zoe to a monastery. The people, who generally take part with the oppressed, revolted at these acts of tyranny, recalled Zoe and her sister Theodora, and proclaimed them joint sovereigns. Michael was now glad to take refuge in a monastery, and assumed the religious habit, hoping to escape farther injury, but at the instance of Theodora he was deprived of his sight, an usual though horrible punishment at that period, and, with all his relations and adherents, was sent into banishment, having occupied the throne only four months. Gibbon. Univer. Hist.

MICHAEL VI., furnamed *Stratioticus*, was appointed by the empress Theodora as her successor on the throne, which he ascended in the year 1056. He was already advanced in years, and enjoyed a reputation for military talents, but was wholly unacquainted with the art of government, its nature and principles. He gave himself up to the dominion of his eunuchs, who made an ill use of their influence, so that a conspiracy was excited, and Isaac Comnenus was elevated to the imperial dignity. The new emperor assembled an army in the eastern provinces, with which he proceeded towards the capital. In the neighbourhood of Nice he was met by the forces of Michael, and an engagement ensued, in which the latter were completely overthrown. Michael now saw that he had in vain exacted an oath from the citizens of Constantinople never to acknowledge Comnenus for emperor. At the approach of the conqueror, a decree was unanimously passed, investing him with the imperial title and authority, and a deputation of bishops was sent to Michael, commanding him formally to renounce the sovereignty. "What," said the fallen prince, "will you give me in exchange for the empire?" "The kingdom of heaven," they replied. He submitted and retired to a monastery, after a reign of about a year. Gibbon. Univer. Hist.

MICHAEL VII., furnamed *Parapinaces*, the son of Constantine XI., was proclaimed emperor in the year 1071, on the defeat and capture, by the Turks, of Romanus Diogenes. He had been well educated, and had studied philosophy and rhetoric, but was unfit for the cares of the empire, which devolved upon his uncle. He was charged with diminishing the measure of corn for his own emolument, during a scarcity, which fixed upon him his reproachful surname. An invasion of the Turks, and a revolt among his own people,

forced him to resign his crown, and retire to a monastery, after a reign of six years and a half. He died at Ephesus, having been consecrated bishop of that see. Univer. Hist.

MICHAEL VIII., of the noble family of Palæologi, was brought up to the military service, and obtained popularity and distinction by the graces of his person and manners. In his youth he was commander of the French mercenaries in the employ of the empire. During the reign of John Vataces he was accused of ambitious designs, but cleared himself so well of the charge, that he was not only honourably acquitted, but made governor of Nice. In the year 1255, new charges were brought against him, and he privately withdrew to the Turkish sultan of Iconium, by whom he was honourably received, and placed at the head of a body of Greeks in Turkish pay, with whom he distinguished himself against the Tartars. After this he was recalled by the emperor Theodore, and at his death, in 1259, he recommended him as the guardian and protector of his son John, who was then a minor. He now assumed the title of grand-duke, and the office of regent of the empire was delegated to him. His ambition began to display itself, and he employed every art to give splendour to his administration, and impress the people with the idea of his fitness for the throne. The news of a victory over the despot of Epirus was the signal for the people in Michael's interest to salute him with the title of emperor, and it was agreed that he and the young prince John should wear the purple conjointly. The patriarch, with great reluctance, was induced to place the imperial crown upon the head of Michael alone, while John walked in his train, distinguished only by a diadem of very inferior worth. This was in 1260, and in the following year Michael received the welcome intelligence of the recovery of Constantinople, to which city he and his court removed from Nice. He shewed that he was capable of acting on the most liberal principles: he restored the city to its ancient splendour, and encouraged the continued residence of the Genoese, Venetian, and Pisan merchants; but having attained to a good share of popularity, he felt himself sufficiently strong to commence a new era by reigning sole emperor. To remove his competitor from the chance of opposing his projects, he caused his sight to be destroyed. For this infamous act of barbarity, the patriarch Arsenius pronounced a sentence of excommunication against him, which he refused to recal, unless he would exhibit signs of repentance by abdicating his throne. The emperor, trusting to his own strength, deposed and banished the patriarch, but he had attached to his cause so large a party among the clergy, that a schism in the Greek church was the consequence, which continued a number of years. Michael, as a warrior and politician, was successful in many of his projects; he recovered several of the finest islands in the Archipelago, as well as part of the Morea, from the Franks; but on the other hand, the despot of Epirus, and the king of Bulgaria, made incursions into Thrace, and laid waste the country with fire and sword. These and many other troubles induced him to seek the favour of the Roman see, by proposing an union between the Greek and Latin churches, with an acknowledgment of the supremacy of Rome. This was effected at the general council of Lyons, under pope Gregory X., in 1274, an act which extremely disgraced his own subjects, and he was obliged to institute a violent persecution against the schismatic Greeks, in order to preserve the semblance of an union. This so irritated his own family, and the inhabitants of Constantinople, that he was eventually excommunicated by pope Martin IV., for the share which it was known he had in the massacre of the French in Sicily, known by

by the name of the Sicilian vespers. He died in 1283, at the age of 58, and in the 24th year of his reign. His son Andronicus, whom he had associated with himself in the empire, instantly dissolved the union of the churches, and refused his father Christian burial. Gibbon. Univer. Hist.

MICHAEL, FRONDOVITCH, czar of Russia, was son of Theodore Nikiliz Romanof, an archbishop of Rostock. After the dethronement of the czar Zulkri, in 1610, a party of Russian nobles offered the crown to Ladislaus, prince of Poland, and a Polish garrison had been admitted into Moscow, which was the occasion of much bloodshed. It was after some time expelled by a more numerous party of Russians, who elected Michael, the subject of this article, then a youth of seventeen, as new czar. He was distinguished by his descent from a daughter of Ivan Vasilevitch, and rendered dear to the nation by the virtues of his father. At the time of the election he was in a monastery with his mother, while his father was a prisoner in Poland; and when the proposal was made to raise him to the throne, the unhappy fate of some of the late czars filled his mother with such apprehensions, that she did every thing in her power to get him excused the intended honour. The senate, however, persisted in their choice, and Michael was solemnly elected in 1613. He was immediately involved in a war with the generals of Gustavus Adolphus, king of Sweden, which was concluded in 1617, and in the following year a truce was made with the Poles, who had supported, by force of arms, the prior election of their prince Ladislaus, and had actually ravaged the country as far as Moscow. In 1625, the young czar married Eudocia, the daughter of a poor gentleman of no fortune, but of great beauty and accomplishments. The interval of peace he employed in promoting the internal prosperity of Russia, and formed a commercial connection with the states of the United Provinces. War was renewed with Poland in 1632, but was terminated in about two years, and from this period the czar preserved his country in a state of tranquillity, respected by neighbouring sovereigns for his equity and good faith, and greatly beloved by his subjects, on account of the mildness and beneficence of his government. He died in 1645, in the thirty-third year of his reign, leaving his crown to his son Alexis. Coxe's Travels.

MICHAEL CERULARIUS, patriarch of Constantinople, was raised to that dignity in the year 1043. He was a person of vast ambition, and a determined enemy to the church of Rome and the papal claims, and in 1053 he revived the famous contest between the Greek and Latin churches, which had been suspended for a considerable time. He pleaded in his justification a sacred regard to truth and the interests of religion, but the true and genuine causes were the arrogance and ambition of the Grecian patriarch and Roman pontiff. Among the measures to which they mutually had recourse, in order to sap the foundations of each other's authority and influence with the people, were accusations of holding corrupt doctrines. Cerularius struck the first blow, by a letter written in his own name, and in the name of Leo, bishop of Acrida, in which he publicly accused the Latins of various errors. To this letter pope Leo IX. wrote a very imperious reply; assembled a council at Rome, and excommunicated the Greek churches. Bitter and very violent measures succeeded on both sides till the year 1057, when a struggle took place between Stratoticus and Isaac Comnenus for the imperial crown: the patriarch embraced the interests of the latter, and was a chief instrument in raising him to that dignity. In the following year, the emperor being compelled by the exhausted state of the public treasury to impose heavy taxes upon the people, drew from

the monasteries a part of their great wealth, with which they had been enriched by his predecessors. This the patriarch resented, and threatened to pull him from the throne to which he had raised him, unless he restored what he had taken from the religious houses. The emperor, without hesitation, arrested, deposed, and banished the patriarch, and in a state of exile he soon died. Some of this patriarch's letters remain, and are referred to by Cave, Dupin, and Mosheim.

MICHAEL, *St.*, in *Geography*, a town of Italy, in the duchy of Mantua, on the Tartaro; 20 miles E. of Mantua.—Also, a town of Italy; 12 miles S.W. of Mantua.—Also, a small island in the English channel, off East Looe, in Cornwall. N. lat. 50° 18'. W. long. 4° 32'.—Also, a town of the duchy of Holstein; 6 miles S. of Meldorp.—Also, a town of England, in the county of Cornwall, which, though a small place without a market, sends two members to parliament; 8 miles N.E. of Truro, and 249 W.S.W. of London. N. lat. 52° 22'. W. long. 4° 52'.—Also, a town of Canada, in the river St. Lawrence; 15 miles N.E. of Quebec.—Also, a river of Maryland, which runs into the Chesapeake, N. lat. 38° 50'. W. long. 76° 22'.—Also, a town of Sweden, in the province of Savolax; 10 miles N.N.E. of Chrilliana.—Also, a town of America, in the state of Maryland, and county of Talbot; 21 miles S.E. of Annapolis.—Also, a town on the S. peninsula of St. Domingo island, called "Fond des Nagra;" 10 leagues N.E. of St. Louis.—Also, an island in the Atlantic, called "San Miguel," the largest of the Azores, discovered by Gonfalo Velho Cabral in the year 1444. It is about sixty miles in circumference, and has several towns and villages, which carry on a great trade in corn, wine, and cattle, though none of its harbours are good or safe. Its chief towns are Punta del Gada, and Villa Franca. The former is rendered important by its commerce, by its strong castle, in which the Portuguese keep a garrison, and by its being the residence of the primate of the Azores. The number of inhabitants in this island is variously estimated, from 25,000 to 50,000. The town of Punta del Gada is situated in N. lat. 37° 47'. W. long. 25° 42'.

MICHAEL, *St.*, in *Lungau*, a town of the archbishopric of Salzburg; 14 miles S.S.E. of Radstadt.

MICHAEL'S *Bay, St.*, a bay on the W. coast of the island of Curaçoa.—Also, a bay of Nova Scotia, on the W. coast of the bay of Fundy.—Also, a bay on the E. coast of Labrador. N. lat. 52° 55'. W. long. 55° 40'.

MICHAEL'S *Point, St.*, a cape on the N.W. coast of Prince's island, in the Atlantic. N. lat. 1° 55'. E. long. 7° 1'.

MICHAEL, *St. Gulf of*, a bay on the coast of South America, in the S.E. part of the gulf of Panama, formed by the mouths of the rivers Congo, Santa Maria, and some others. In it are several islands, which shelter good ridings for ships, and the gulf is sufficiently capacious for a large fleet. The sides are surrounded with mangroves, growing in wet and swampy land.

MICHAEL, *Order of St.*, in *Heraldry*, was instituted by Lewis XI., king of France, in the year 1469, but declined under the reigns of Charles IX. and Henry III. In the year 1661, Lewis XIV. regulated this order, and lessened the number of knights; thus restoring its reputation, so that it rose into high esteem in France. The mantle of the order was of white damask, bordered all round with embroidery in gold and colours, representing the collar of the order, and lined with ermine; the chaperon was of crimson velvet, embroidered like the mantle, under which the knights wear a short coat of crimson velvet. The badge of the or-

der is a medallion of gold, representing St. Michael trampling on a dragon, enamelled in proper colours, and worn pendent to a collar, composed of escallop-shells, and chains of gold interwoven like knots. The knights usually wear this badge pendent to a broad black watered ribbon.

MICHAEL, *Order of the Wing of St.*, an order in Portugal, instituted in 1172 by Alphonso, king of Portugal, in commemoration of a signal victory which he gained over Albarac, king of Seville, in consequence, as he imagined, of his having ardently invoked the aid of St. Michael the archangel. The habit of the order was of white silk, on the left breast of which was embroidered a wing purple, within a circle of rays gold. The badge was a cross fleury, fitchy gules, cantoned in base with two fleurs-de-lis; over the cross, on an escroll, this motto, "QUIS UT DEUS."

MICHAELIS, JOHN DAVID, in *Biography*, a celebrated biblical critic, and professor of divinity and the Oriental languages, was born at Halle, in Lower Saxony, in the year 1717. He received a private education, but the Greek language made no part of it till within half a year of its completion, a circumstance which he never ceased to regret. In 1729 he was sent to the public school of the orphan-house, and at the same time he occasionally attended his father's lectures on the Hebrew language. Here he received lessons in divinity from Baumgärtner, but the chief benefit which he received from that professor was in the philosophical course. During the latter part of his time at school, he acquired a great facility in speaking Latin, and in thinking systematically, from the practice of disputation, in which one of the masters frequently exercised him. By his Latin master he was taught to write Latin verses, but as he advanced in life he renounced that study, considering it to be a pedantic mis-employment of time. In the year 1733, Michaelis entered into the university of his native place, in order to qualify himself either for the clerical profession, or for the chair of oriental literature, in which his father hoped to see him one day his successor. Here he applied himself with all diligence to the study of mathematics, metaphysics, theology, and the oriental languages. He also prepared himself for pulpit services, and preached with great approbation at Halle and other places. In the year 1739 he took a degree in philosophy, and about the same time he was the subject of a temporary melancholy, which threatened to prove a serious injury to his health, and which was owing to religious impressions, originating in certain misconceptions of some of the scriptural precepts, to which he affixed literal interpretations. Upon his recovery, he was appointed assistant lecturer under his father, having shewn how well qualified he was for that situation, by publishing a small treatise, "De Antiquitate Punctionum Vocalium." In 1741 he left his own country with a view of visiting England, and passing through Holland, became acquainted with the celebrated Schultens, from whom he received many marks of the most friendly attention. Upon his arrival in England, he engaged to officiate for the German chaplain to the court, who was at that time in an infirm state of health, and continued to preach at the palace-chapel nearly a year and a half. During this period he visited the university of Oxford, greatly increased his knowledge of the oriental languages, and formed an intimacy with some of the first literary characters of that age, particularly with Dr. Lowth, afterwards bishop of London, on some of whose lectures "De Sacra Poesi Hebræorum" he attended. Upon the return of Michaelis to Halle, he resumed his labours in the professional chair, as assistant to his father, and delivered lectures on the historical books of the Old Testament, the Syriac and Chaldee languages, and also upon natural history, and the Roman classics; by the exercise of his ta-

lents on these subjects he maintained and increased the fame which he had already acquired, but without having the prospect of any immediate good establishment. He therefore resolved to quit Halle, and in 1745 he went to Gottingen, in the capacity of private tutor. In the following year he was made professor extraordinary of philosophy in the university of Gottingen, and, in 1750, professor in ordinary in the same faculty. In 1751 he was appointed secretary to the newly instituted Royal Society of Gottingen, of which he afterwards became director, and about the same time was made aulic counsellor by the court of Hanover. During the year 1750, he gained the prize in the Royal Academy of Berlin, by a memoir "On the Influence of Opinions on Language, and Language on Opinions." While the seven-years' war lasted, in which the university of Gottingen was particularly distinguished, Michaelis met with but little interruption in his studies, being exempted, in common with the other professors, from military employment; and when the new regulations introduced by the French in the year 1760, deprived them of that privilege, by the command of marshal Broglio, it was particularly extended to M. Michaelis. For this mark of his favour he was indebted to the good offices of his friend Thierry, who was in great esteem with the minister. Soon after this, he obtained from Paris, by means of the marquis de Lottange, the manuscript of Abulfeda's Geography, from which he afterwards edited his account of the Egyptians. From this time that nobleman was Michaelis's firm friend, and had no little share in procuring him the honour of being chosen correspondent of the "Academy of Inscriptions at Paris," in 1764, and of being elected one of the eight foreign members of that institution. In the year 1760, the professor gave great offence to those of the clergy who styled themselves orthodox, by publishing his "Compendium of dogmatic Theology," consisting of doctrinal lectures which he had delivered by special licence from the government. Shortly after this, Michaelis shewed his zeal for the interests of science and literature, by the part which he took in the project of sending a mission of learned men into Egypt and Arabia, for the purpose of obtaining such information concerning the actual state of those countries, as might serve to throw light on geography, natural history, philology, and biblical learning. He first conceived the idea of such a mission, which he communicated by letter to the privy counsellor Bernstorff, who laid it before his sovereign Frederic V. king of Denmark. That sovereign was so well satisfied of the benefits which might result from the undertaking, that he determined to support the expense of it, and he even committed to Michaelis the management of the design, together with the nomination of proper travellers, and the care of drawing up their instructions. Upon the death of Gefner in 1761, Michaelis succeeded in the office of librarian to the Royal Society, which he held about a year, and was then nominated to the place of director, with the salary for life of the post, which he then resigned. Two years afterwards he was invited by the king of Prussia to remove to Berlin, but his attachment to Gottingen led him to decline the advantages which were held out to him as resulting from the change. In 1766 he was visited at Gottingen by sir John Pringle, whom he had known in England, and Dr. Franklin. With the first he afterwards corresponded on the subject of the leprosy, spoken of in the books of Moses, and on that of Daniel's prophecy of the seventy weeks. The latter subject was discussed in the letters which passed between them during the year 1771, and was particularly examined by the professor. This correspondence was printed by sir John Pringle in 1773, under the title of "Joan. Dav. Michaelis de Epistolæ, &c. LXX. Hæbdomalibus

domalibus Danielis, ad D. Joan Pringle, Baronettum: primo privatim mittit, nunc vero utriusque Consensu publicè edita." In the year 1770, some differences having arisen between Michaelis and his colleagues in the Royal Society, he resigned his directorship. In 1775 his well-established reputation had so far removed the prejudices which had formerly been conceived against him in Sweden, that the count Höpkin, who some years before had prohibited the use of his writings at Upsal, now prevailed upon the king to confer upon him the order of the Polar star. He was accordingly decorated with the ensigns of that order, on which occasion he chose as a motto to his arms "libera veritas." In 1782 his health began to decline, which he never completely recovered; in 1786 he was raised to the rank of privy counsellor of justice by the court of Hanover; in the following year the Academy of Inscriptions at Paris elected him a foreign member of that body; and in 1788 he received his last literary honour by being elected a member of the Royal Society of London. He continued his exertions almost to the very close of life, and a few weeks before his death, he shewed a friend several sheets, in MS., of annotations which he had lately written on the New Testament. He died on the 22d of August, 1791, in the seventy-fifth year of his age. He was a man of very extensive and profound erudition, as well as of extraordinary talents, which were not less brilliant than fold, as is evident from the honours which were paid to his merits, and the testimony of his acquaintance and contemporaries. His application and industry were unwearied, and his perseverance in such pursuits as he conceived would prove useful to the world, terminated only with the declension of his powers. His writings are distinguished not only by various and solid learning, but by a profusion of ideas, extent of knowledge, brilliancy of expression, and a frequent vein of pleasantry. In the latter part of his life he was regarded not only as a literary character, but as a man of business, and was employed in affairs of considerable importance by the courts of England, Denmark, and Prussia. His works, as an author, were exceedingly numerous, of which a very long list is given in the General Biography. Of those with which the English scholar has been brought acquainted, the most important is the "Introduction to the New Testament," translated into English from the first edition, and published in 1761, in a quarto volume. In 1788, the fourth edition was published in two volumes quarto. The object of this work, which is purely critical and historical, is to explain the Greek testament, with the same impartiality, and the same unbiassed love of truth, with which a critic in profane literature would examine the writings of Homer, Virgil, &c. The first volume contains an examination of the authenticity, inspiration, and language of the New Testament. The second volume contains a particular introduction to each individual book of the New Testament. An English translation of it has been published by the Rev. Herbert Marsh, in six volumes, royal octavo. Gent. Magazine, March 1792. See also the prefaces by Mr. Marsh.

MICHAELIS, JOHN-HENRY, a learned German divine and orientalist, the son of a citizen of Elrich, was born at Kettenburg, in the county of Hohenstein, in the year 1668. He was intended for trade, but discovering a stronger inclination for study than business, he was allowed to follow the bias of his mind, and obtained admission into the school of St. Martin in the city of Brunswick. Here he was appointed to instruct some of the younger scholars, in which employment he acquitted himself greatly to the satisfaction of the rector of the school. After this he was entered of the university of Leipzig, where he went through courses of philosophy and divinity, and also studied the oriental languages and rabbinical

Hebrew. In 1694 he quitted Leipzig for the university of Halle, where he taught the Greek, Hebrew, and Chaldee with great reputation. Here he published, with the assistance of professor Francke, a work entitled "Conamina brevioris Manuductionis ad Doctrinam de Accentibus Hebræorum Prolatæ." In 1696 he published another piece, entitled "Epiertia philologica de reverendi Michaelis Beckii, Ulmenis, Disquisitionibus philologicis, cum responsionibus ad Examen XIV. Dictor. Gen." He was now thoroughly conversant, not only with the Greek, Hebrew, and Chaldee, but likewise with the Syriac, Samaritan, Arabic, and rabbinical Hebrew, and having formed an acquaintance with Job Ludolf, he accompanied him to Frankfort, for the purpose of learning the Ethiopic language under his instructions. In 1699, he succeeded Francke in the Greek professorship at Halle, and in 1707 was made keeper of the university library. He was afterwards nominated professor of divinity in ordinary, and admitted to the degree of D.D. In 1732 he was made senior of the faculty of divinity, and inspector of the theological seminary. He died in 1738, at about the age of seventy. He was author of many works besides those already mentioned, the titles of which are enumerated in Mœri.

MICHAELMAS, the feast of St. Michael the archangel, held on the 29th of September.

MICHAELMAS *Island*, in *Geography*, a small island at the entrance of king George III.'s Sound, on the S.W. coast of New Holland; 4 miles N.N.E. of Bald Head.

MICHAILA, *St.*, a town of Russia, in the government of Revel; 36 miles S. of Revel.

MICHAILOV, a town of Russia, in the government of Riazan; 24 miles S.S.W. of Riazan. N. lat. 54° 20'. E. long. 38° 38'.

MICHALOWKA, a town of Poland, in Volhynia; 52 miles N. of Zytomiers.

MICHAUT, PIERRE, in *Biography*, secretary to the count de Charolois, son of the duke of Burgundy, in 1466, was author of the poem, entitled "Doctrinal de la Cour, ou Danse des Aveugle;" Instructions for the Court, or Blind-man's-buff. From a beautiful copy of this satirical poem, finely illuminated, M. Laborde has given representations of all the musical instruments used in France during the 15th century in the hands of the performers. *Essai sur la Mus.*

MICHAUXIA, in *Botany*, named by M. L'Heritier, in one of his monographs, in honour of his friend Andrew Michaux, botanist to the late king of France, Louis XVI., and well known by his botanical expeditions to Syria (where he gathered this plant), Persia, North America, and New Holland. The *Flora Boreali-Americana*, often quoted by us, the fruit of his six years' labours in America, was published by his son. We have already offered some remarks on the name of the present genus. (See MEDIUM.) As to its botanical stability, none who consider the variety of shapes in the corollas of reputed *Campanula*, can feel quite sure on the subject; but the author of this genus had contemplated the question with singular attention, and with all his wonted sagacity. He declares *Michauxia* to differ from *Campanula*, as *Chlora* from *Gentiana*, the number of the parts being as eight to five, and the corolla that of a *Phyteuma*, but in eight divisions. It is at least a good artificial genus, and now generally adopted, except that Justieu adheres to one of its ancient names. (See MINDIUM.) L'Herit. Monogr. 3. Schreb. 840. Willd. Sp. Pl. v. 2. 342. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 353. Lamarck Dict. v. 4. 134. Illustr. t. 295. (Mindiium; Juss. 164.)—Clafs

and order, *Ochlandria Monozynia*. Nat. Ord. *Campanaceæ*, Linn. Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, in sixteen lanceolate unequal segments, every other one reversed. *Cor.* of one petal, wheel-shaped, much larger than the calyx, in eight very deep, widely spreading, linear-lanceolate, equal segments, revolute at their points. Nectary of eight valves, bearing the stamens. *Stam.* Filaments eight, awl-shaped, permanent; anthers vertical, linear, very long, pressed close to the style. *Pist.* Germen inferior, turbinate; style columnar, permanent; stigma in eight awl-shaped, revolute segments. *Peric.* Capsule turbinate, abrupt, of eight angular cells, without valves, opening by pores at the base. *Seeds* very numerous, oblong, small, affixed to the proper receptacle of each cell, which unites with the central column.

Eff. Ch. Calyx in sixteen deep segments, alternately reflexed. Corolla in eight deep segments. Nectary of eight valves, bearing the stamens. Capsule of eight cells, opening by pores at the base. Seeds numerous.

Obf. It must be allowed that the number of cells in the fruit being equal to that of the parts of the flower, is very different from *Campanula* and *Phyteuma*, and also that there is no botanical analogy between eight and five or three; so that as far as number can be allowed to guide us, no genus can be better defined.

1. *M. campanuloides*. Rough-leaved Michauxia. L'Herit. Monogr. t. 1, 2. Curt. Mag. t. 219. (*Medus*; Diosc. book 4. chap. 18. *Medium* Dioscoridis, or *Mindium* Rhazis; Rauwolf. It. 284. f. 284. Dalech. Hist. append. 33. Bauh. Hist. v. 2. 805. *Campanula peregrina maxima, laciniatis foliis*; Morif. sect. 5. t. 3. f. 31.)—Gathered by Rauwolf in Syria, near Tripoli; and by Michaux, above 200 years afterwards, in the same country. Labillardiere is also said to have found it on mount Lebanon. It was raised from seed at Paris; and was communicated to Kew garden by L'Heritier in 1787, but being a greenhouse biennial plant, and rarely ripening seeds in England, is now not to be met with. The root is spindle-shaped, whitish, milky, like the rest of the plant. Stem from two to six feet high, erect, round, leafy, rough, more or less branched, many-flowered. Leaves scattered, lanceolate, acute, jagged, very rough, wrinkled, dark green, sessile, clasping the stem; the lower ones stalked; the radical ones heart-shaped, soon disappearing. Flowers ranged along the sides, and solitary at the ends of the branches, sessile, drooping, two inches in diameter, very handsome and singular, not unaptly compared by Curtis to some distant resemblance of a Passion-flower. Corolla white, with a tinge of purple at the outside. Stamens and style green, the upper half of the latter loaded with pollen, lodged by the anthers among the hairs which invest it, before they retire and curl themselves together.

L'Heritier's two plates, of this plant and its fructification, are the finest possible, scarcely wanting the assistance of colour to give a complete idea of the objects, and even vieing, in that respect, with the prints of the Houghton Van Huysum. The rude cuts of Rauwolf, Dalechamp, and Bauhin are expressive enough. Morison's engraving, copied and perverted as usual, from them, is very bad. Curtis's plate is necessarily a fragment, but faithful. Tournefort and Linnæus were unaccountably deceived concerning this fine plant. The former confounded it with his own *Campanula foliis profunde incis, fructu duro*; Tourn. Cor. 3, which is *C. lyrata*; Lamarck Dict. v. 1. 588. Hence Lamarck was led into the same error, which he corrected in his v. 4. 134, as above quoted; and hence Mr. Salisbury, in his Prodrômus 127, calls our *Michauxia, Campanula lyrefolia*, citing Lamarck by mistake, and asserting that its fruit is "exactly that of

a *Campanula*." Linnæus confounded our plant with *C. laciniata*, Sp. Pl. 237, figured in Tournefort's Voyage, v. 1. t. 99, than which few things, at all akin, can be more distinct. He also, by the specific name of *Medium*, applied to another kind of *Campanula*, very common in gardens, seemed to consider that as the *μυδιον* of Dioscorides, which we apprehend to be no less a mistake. Dr. Sibthorp suspected *C. laciniata* might be the true *μυδιον*, being probably unacquainted with the *Michauxia*. The latter surely answers best to the original description, such as it is; of which we here subjoin a translation. "Medium grows in shady stony situations. Its leaves are like succory (*σικυ*). Stem three cubits high. Flowers purple, large, and circular. Fruit (or seed) small, like that of *Cnicus*. Root a span long, as thick as a walking-stick." The colour of the flowers probably varies, from different shades of purple, to white.

MICHAUXIA, in *Gardening*, comprehends a plant of the herbaceous flowering, exotic kind, of which the species cultivated is the rough-leaved michauxia (*M. campanuloides*.)

Method of Culture.—It may be raised from seed procured from its native situation, and sown in the early spring season in pots, and plunged in a hot-bed, or simply on a moderate hot-bed. When the plants have attained a little growth, they should be removed into separate pots, and be replunged in the hot-bed. This must afterwards be managed as tender green-house plants.

Plants of this fertile variety in collections of this nature.

MICHAU, in *Geography*, a town of Prussia, in Pomerania; 22 miles W.N.W. of Dantzic.

MICHEL, ST., a small island in the gulf of Venice, near Venice, where the Protestants, who trade thither, have purchased ground on which to build a church.—Also, a town of Italy, in the Veronese; 14 miles N.W. of Verona.—Also, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of St. Jean de Maurienne; 7 miles S.S.E. of St. Jean. The place contains 1450, and the canton 6244 inhabitants, on a territory of 342½ kilometres, in 8 communes.

MICHEL di Capa, St., a town of Peru, in the jurisdiction of Arica, on the borders of a large forest of pimento, which is said to produce annually 300,000lbs. weight of that spice.

MICHEL-Gemote, in *History*. See PARLIAMENT.

MICHEL-Synoth. See PARLIAMENT.

MICHEL LAU, in *Geography*, a town of Prussia, in the territory of Culm; 36 miles E. of Culm.—Also, a town of Silesia, in the principality of Brieg; 8 miles S.S.E. of Brieg. N. lat. 50° 46'. E. long. 17° 35'.

MICHEL BACH, a town of Germany, in the county of Schwarzenburg; 20 miles W. of Anspach.

MICHEL ROMANO, in *Biography*, a disciple of Soriano, and a famous canonist, who flourished at the latter end of the 16th century, and beginning of the next; author of a very curious and scarce work, published at Venice, 1615, entitled "Musica vaga et artificiosa continente motetti con obblighi, e canoni diversi, tanto per quelli che vorranno professare d'intendere diversi studii della Musica," folio; or, Artful and curious Music, as well for those who receive delight from the performance of it, as for others who make music their peculiar study. Hist. vol. iii. p. 519.

MICHEL, JAMES-BARTHOLOMEW, an able mathematician, was born of an ancient family at Geneva, in 1692. He entered into the French military service, and became a captain. In 1738, he retired to his native country, where he applied chiefly to mathematical and philosophical studies. He constructed a number of charts, invented a new thermometer,

monometer, and composed several memoirs, printed at Basle. These are on meteorology and the temperature of the globe; light; the comet of 1680; the universal deluge; &c. He surveyed the Glaciers of Switzerland, of which he took several views, which have been engraved. In the troubles which agitated his country he was a sharer, and was imprisoned a long time by order of the government of Bern. He died in 1766.

MICHELÌ, PETER ANTHONA, an Italian botanist of great celebrity, particularly in what is now called the cryptogamic department, was born at Florence, December 11, 1679. His parents were indigent, and took but little care of his education. He is said, nevertheless, to have been destined to the occupation of a bookseller, but an insatiable thirst after natural knowledge over-ruled all other objects. Content in the humblest poverty, he resigned himself to his favourite pursuit, trusting to that, even for his means of livelihood. Nor was he disappointed. His good character, and distinguished ardour, soon procured him the notice and favour of the marquis Cosmo da Calligione, in whose family a taste for Botany has been almost hereditary, and for whom Micheli in his early youth made a collection of Umbelliferous plants, which even then proved his accuracy and discernment. This gentleman introduced him to the celebrated count LAWRENCE MAGALOTTI, (see that article,) by whom he was presented to his sovereign, the grand duke Cosmo III. The *Institutiones Rei Herbariæ* of Tournefort had just appeared at Paris; and the first pledge of the grand duke's favour, was a present of that book, which to Micheli, who had hitherto found the want of some systematic guide, was a most important and welcome acquisition. He speedily adopted the tone of his leader, with respect to generic distinctions and definitions, and improved upon him in a more frequent adaptation of original specific ones.

In the autumn of 1706, the care of the public garden at Florence, founded by Cosmo I., was confided to Micheli, he being appointed botanist to the grand duke. He was commissioned to travel, not only in Italy, but in various distant countries, to collect plants, and to establish a correspondence, for the benefit of his trust. By the co-operation of his friends Franchi and Gualtieri, the garden was enriched from the then more flourishing one at Pisa; and a Botanical Society was instituted at Florence in 1717, which greatly promoted the interests of the science. In the summer of that year, the great William Sherard, returning from Smyrna to England, visited Florence in his way, and formed a friendship with Micheli, that continued till his own decease in 1728. A frequent correspondence, and interchange of specimens, took place between them, as amply appears by the collections preserved at Oxford, and by the writings of Micheli.

The subject of our memoir continued his scientific studies, as well as his bodily exertions in frequent journies. The fruit of the former was the publication of his great work, entitled *Nova Plantarum Genera*, a folio of 234 pages and 108 plates, in 1729. The result of his journies proved but too soon disastrous. He spent near three months, from the 4th of September to the 30th of November 1736, in an excursion to the north of Italy, visiting the famous mount Baldus, and the Venetian isles; but he caught a pleurisy, from the consequences of which he never recovered, dying at Florence, January 2, 1737, new style, in the 58th year of his age. He was buried in the church of Santa Croce, amongst the ashes of some of the greatest men of his country, and of the civilized world, where a neat marble tablet was erected to his memory by his associates. The simple and elegant inscription was probably composed by his

learned friend Antony Cocchi, to whom he always confided the revision of his Latin works, before publication, and who delivered an Italian oration in his praise, in the council chamber of the Old Palace, August 7, 1737, which was soon after published. The epitaph is as follows.

PETRUS ANTONIUS MICHELIVS
vixit annos LVII dies XXII in tenui re
beatus omnis historiæ naturalis
peritissimus magnorum etrutic
ducum herbarius inventis et scriptis
ubique notus ac propter sapientiam
suavitatem pudorem optimis
quibusque ætatis suæ egregie carus
obiit IV nonas Januarias MDCCXXXVII
amici vere conlato titulum posuere.

It does not appear that Micheli was ever married. He is described by his contemporaries as a man of the most pleasing, modest, and liberal manners, no less ready to communicate, than eager to acquire, knowledge. His bodily constitution was good; his health uninterrupted; till his last illness, which was of so decided a nature, that he placidly yielded to his fate, not only with the Catholic ceremonies, but with the feelings of a Christian. His friend Cocchi informs us, that "he was endued with a clear and concise natural eloquence; and although the poverty of his parents deprived him of the advantages of a learned education, he had, by his own application, acquired, with wonderful felicity, a knowledge of Latin."—"The writings of the most eminent botanists were so familiar to him, that he had learned to express his ideas in Latin, by no means amiss, he having a very quick perception as to any barbarous expressions."

We are anxious to collect every particular of the life and character of the author of such a book as the *Nova Plantarum Genera*; a work much more extensive in its compass than the *Historia Muscorum* of Dillenius, superior in physiological merit, as well as in technical style of definition, though deficient in historical and critical disquisition, as well as in description. It is to be lamented that Micheli fell so much into the dry catalogue style of Tournefort, though he has greatly improved upon his model; because they have neither of them attained any thing like the technical synoptical terseness and precision of subsequent times. The great merit of Micheli consists in his accurate scientific illustration of some of the most difficult tribes of plants, which Tournefort had left unattempted. The order of the *Calamariæ*, and particularly the difficult genus *Carex*, first assumed an intelligible form under his hands. The seeds of the latter, and their coverings, were first resorted to, with the happiest effect, for specific discrimination. (See CAREX.) A vast number of species of the hitherto neglected genus *Lichen* were ascertained and well delineated. It is with great injustice that Dillenius, whose figures of the crustaceous and imbricated Lichens are the meanest part of his work, charges Micheli with erring on the side of luxuriance in his representations. He had indeed more favourable subjects of investigation, owing to the climate in which he lived; for in Italy the plants in question are found vastly more luxuriant and prolific than in the north of Europe; and we can aver that the figures and descriptions of Micheli are as faithful as those of Dillenius himself; they cannot be more so. (See DILLENIVS.) The parts of the flowers of Mosses, properly so called, were first displayed in the work of Micheli, though he did not understand their real uses. (See MUSCI.) He was equally successful in the collateral families, now termed *Hepatica*, founding the genera of *Blasita*, *Marfiltea*, *Jungermannia*.

nia, *Spharocarpus*, *Anthoceros*, *Targionia*, &c. In the natural order of *Fungi*, till then almost totally neglected, he displayed great accuracy and originality, and gave the first synoptical distribution of those difficult vegetables, by which his followers have profited. Many genera of the more perfect or phænogamic plants are also illustrated or founded in this work of Micheli; but neither their distinctions nor their nomenclature is, in general, so good as the former. In specific distinction, he was too prone to raise varieties to the importance of species, of which his numerous kinds of *Trifolium* are instances.

Our author had extended his studies to the Submarine plants, or Sea-weeds, and had numerous plates engraved, for publication in a second volume, had his life been prolonged. Of these plates a set of impressions, procured by the late lord Bute, was bought at his lordship's sale, by the Rt. Hon. sir Joseph Banks, and is, through his liberality, accessible to all. Another set, now in the Linnæan library, was given to its present possessor by Dr. Targioni Tozzetti of Florence, whose father purchased all Micheli's remains, among which are valuable manuscripts of various kinds; especially the descriptions of these plates. There are likewise some rude drawings of *Orchidææ*, the work we believe of Micheli himself. His pencil however was not sufficiently excellent to enable him to be in general his own draughtsman; still less could he, like Dillenius, engrave the plates he published. In studying the above-mentioned marine productions, it is not wonderful, nor reprehensible, that he then confounded corals and corallines with plants, and made a genus out of the present *Sertularia*, which he called *Dillenia*.

Micheli had prepared an alphabetical catalogue of the plants in the garden, of which he had the superintendance. This was published in 1748, in folio, with seven botanical plates, besides a plan of the garden, under the title of *Catalogus Plantarum Horti Cæsarei Florentini*; for the race of the Medici, and the golden age of Florence, had now passed away. Their imperial successors, however, patronized science, and the volume in question is dedicated to the emperor Francis I., by its editor John Targioni Tozzetti, who has prefixed an excellent historical preface of his own; as well as a more oratorical Italian discourse, upon natural history, by the before-mentioned Antony Cocchi.

The studies of Micheli were extended to fossils, and petrifications, of both which numerous specimens remain in his museum: but he published nothing respecting them. An account of three of his botanical tours in Italy is said, by Haller, to be extant, in the sixth volume of Travels published by Targioni Tozzetti; but of this publication we have seen only the first volume. We ought also to mention his first publication in 1723, an octavo pamphlet on *Orobanche*, in Italian, chiefly with a view to its extirpation, as a noxious weed. This is said to be best accomplished by eradicating the beans or other plants, on which the *Orobanche* may be perceived to have fixed itself, in the month of April; by which procedure, being an annual herb, its propagation is cut off. Works of Micheli. Smith's Tour on the Continent. Cocchi Elogio di P. A. Micheli. Halber Bibl. Bot. S.

MICHELIA, in *Botany*, so denominated by Linnæus, in memory of the great Florentine botanist Micheli. (See the last article.) Linn. Gen. 278. Schreb. 374. Willd. Sp. Pl. v. 2. 1260. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 332. Juss. 280. Lamarck Dict. v. 1. 690. Illustr. t. 493. Gært. t. 137?—Class and order, *Polyandria Polygynia*. Nat. Ord. *Coadunate*, Linn. *Magnolia*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, coriaceous, splitting longitudinally, falling off as the flower expands. Cor. Petals numerous, lanceolate, in several rows; the outer ones largest. Stam. Filaments numerous, short, linear, inserted into the common receptacle of the pistils below the germens; anthers terminal, linear, of two cells, bursting longitudinally at the inner side, surmounted by a bluntish point. Pist. Germens numerous, imbricated in an oblong spike; styles none; stigmas reflexed, obtuse. Peric. Berries equal in number to the germens, coriaceous, globose, of one cell, disposed in a large cluster. Seeds from four to eight, angular on one side, convex on the other.

Ess. Ch. Calyx of one leaf, coriaceous, immediately deciduous. Petals numerous, in several rows. Berries numerous, with several seeds.

1. *M. Champaca*. Sweet Yellow Michelia, or Champawk. Linn. Sp. Pl. 756. (Champacam; Rheede Hort. Mal. v. 1. 31. t. 19. Sampacca; Rumph. Amboyn. v. 2. 199. t. 67. Champe; Baul. Pin. 470.)—Leaves lanceolate, somewhat ovate. Calyx externally silky.—Native of Malabar, in sandy places, flowering twice in the year, but not bearing fruit till it is very old. Rheede. Commonly cultivated throughout India, especially in the Malay countries, but never found wild. Rumphius. Cultivated at Orford, Lancashire, by John Blackburne, esq. in 1779. Hort. Kew. This tree is celebrated for the exquisite perfume of its flowers, of which most Europeans, who have been in India, speak with rapture, though some find it too powerful. The natives adorn their heads with these flowers, both for the sake of the perfume, and for the elegant contrast of their rich orange colour, with their own black hair. The tree is of a moderate size; the bark of its root red, bitter, and very acrid, according to Rheede. Branches round, alternate, smooth, leafy, chiefly at their extremities. Leaves alternate, flaked, a span long, ovato-lanceolate, entire, taper-pointed; a little tapering at the base; somewhat silky when young, but finally smooth, or nearly so; rather glaucous beneath; furnished with a midrib, and many transverse, oblique, parallel veins, connected by innumerable fine reticulations. Footstalks an inch long, minutely hairy, channelled above. Stipulas none. Flowers not unlike a double narcissus, axillary, solitary, on simple, short, very thick stalks. Petals elliptic-lanceolate, the colour of the yolk of an egg, the outermost about an inch and a half long. Calyx ovate, scarcely an inch long, finely silky, splitting down one side, and separating from the base, before the flower can expand. Fruit resembling a large bunch of grapes, of a pale yellowish-white when ripe, very acrid to the taste, and unpleasant to the smell, according to Rheede. The seeds are from four to eight, angular from mutual pressure, the size of small peas.

Such is the real *M. Champaca*, of which we have obtained fine specimens from Madras, and have consequently been enabled to correct the description of the calyx, which authors have greatly misunderstood. Rheede and Rumphius misled Linnæus to suppose there was none; for he originally described this plant from books only. Afterwards procuring, by the name of *Tsiampacca lalac*, a specimen of our *Magnolia pumila*, (see *MAGNOLIA*, n. 7, where it will appear how much such exotic names are liable to corruption,) he mistook this for *Michelia Champaca*, and thence altered the character of the genus, in his *Mantissa* 40, attributing to it a calyx of three oblong petal-like leaves. How Lamarck discovered and figured a short permanent three-leaved calyx we know not. Linnæus had in his herbarium the real *Champaca*, inscribed *Tsiampacca eoengang*, as far as we can decypher the scrawl, which he marked *M. Tsiampacca*.

Tsiampacca. Our Indian botanical friends assure us this is only the same name spelt differently, and therefore some contend for the excellence of only one species of *Michelia*. We shall endeavour to establish a second.

2. *M. sylvestris*. Wild Whitish Michelia. (*M. Tsiampacca*; Linn. Mant. 78. *M. eunymoides*; Burm. Ind. 124. *Simpacca sylvestris*; Rumph. Amb. v. 2. 202. t. 68.)—Leaves elliptical. Calyx nearly smooth.—Linnaeus received this from India by the name of *Tsiampacca poeti*, or White Champawk, which agrees with the name and synonym in Rumphius. It differs from the former in the broad elliptical shape, and perfect smoothness of its leaves. The calyx also is smooth, having merely a very slight silkiness at the tip; the rest being finely granulated. Our specimens shew nothing further, but they agree with all the above synonyms perfectly, except that Burmann has a very erroneous quotation of Sloane, and moreover says the Javanese call this species *Tsiampacca connexa*, which Linnaeus, we know not on what authority, applied to the former. We could not retain Burmann's specific name, because it seems suggested by Sloane's synonym, and is totally irrelative to our plant. *Tsiampacca* and *Champaca* are, as we have said, synonymous and ambiguous. We therefore adopt a name from the manuscripts of Linnaeus, which it is pity he altered. Rumphius describes the *M. sylvestris* as a more tall and upright tree than the *Champaca*, with larger and broader leaves, the breadth of four fingers (exactly as we have them); and he very accurately remarks that they have fewer ribs, or transverse veins. Flowers exactly like the former, except that their petals are broader, whitish, or straw-coloured, with but a slight degree of odour. When cultivated however they acquire a stronger and more delightful smell, though not equal to the *Champaca*. The fruit is much the same, though the seeds, which vary from two to seven in number, are scarcely so red. It is very possible that this may, after all, be only the wild state of the *Champaca*, but we have now furnished sufficient materials to prevent any future mistake of either, and we trust the generic character is sufficiently established. Gærtner obtained from Thunberg, as the fruit of *M. Tsiampacca*, what looks most like a *Magnolia*, and we cannot but think, the more it is compared with Rumphius, whose figures, we must always recollect, are diminished, the more it will prove different from his.

If Andrews's tab. 229, *Magnolia fuscata*, (see *MAGNOLIA* n. 8,) be compared with our description of the calyx of *Michelia*, they will be found to agree. The petals however are those of a *Magnolia*, and we must still remain in doubt for want of the fruit of this elegant shrub. It is curious that Linnaeus had a specimen of this *Magnolia*, which he very incautiously marked *Michelia Tsiampacca*. On dissecting a flower, he found the calyx of three leaves. Whether this be correct or not, though we have three coloured figures of this plant in our periodical publications, none of them enables us to form even a conjecture, except Andrews, and this but incidentally. We have some suspicion that Loureiro's *Liriodendron Figo* may possibly be the same with *Magnolia fuscata*, but unfortunately his slight mention of the fruit affords no certain information as to its genus. The calyx however, being of one leaf, agrees. He says his plant is called at Macao *Fula Figo*. Has this any connection with the *Fulle*, Bauh. Pin. 470?

This fine tribe of plants is so little understood by botanists, and so many errors have attended the history of the *Michelia*, which the Linnaean herbarium alone could explain or remove, that we have been more particular than usual, and still the subject is far from being exhausted. S.

MICHELIA, in *Gardening*, comprehends a plant of the tree or shrub kind, of which the species commonly grown is the *champaca*, or Indian *Michelia*, (*M. champaca*.)

Method of Culture.—This is a plant which may be increased by seeds, layers, and cuttings, being managed in the same manner as the more tender green-house plants afterwards.

They afford variety in collections of stove plants.

MICHELPACH, in *Geography*, a town of Austria; 12 miles S.E. of St. Polten.

MICHELSDORF, a town of Bohemia, in the circle of Chrudim; 9 miles N.E. of Leutmschl.

MICHICOU, a river of America, in the state of Vermont, which runs into lake Champlain. N. lat. 44° 55'. W. long. 72° 56'.

MICHIGAN, the largest lake in the territory of the United States, lies between 41 8', and 45 40' N. lat. and between 84° and 87° W. long. Its length is estimated at 260 miles from N. to S., and its circumference at 945 miles; and, according to Mr. Hutchins, it contains 10,368,000 acres. It is navigable for ships of any burden. It communicates with lake Huron at the N.E. part through the straight of Michillmackinac, which is six miles broad, with a fort of its name on an island at its mouth. In this lake are several kinds of fish, and particularly excellent trout, weighing from twenty to sixty pounds. On the N.W. parts of this lake the waters pass through a narrow strait, and branch out into two bays; that to the northward is called Noquet's bay, and the other to the southward Puans, or Green bay, which forms with the lake an extended peninsula, called cape Townsend, or Vermilion point. About thirty miles S. of Bay de Puans, is lake Winnebago, which communicates with it, and a very short portage interrupts the communication south-westward from Winnebago lake through Fox river, then through Onisconm, into the river Mississippi. Chicago river, at the S.W. extremity of lake Michigan, furnishes a communication, interrupted by a still shorter portage, with Illinois river. Lake Michigan receives many small rivers from the W. and E., some of which are 150 and even 250 yards broad at their mouths.

MICHILLIMAKKINAK, called by the Canadians "La Gros Isle," the name of an island, fort, and village, on the S.W. side of the straits of the same name. The island on which the village and fort stand is very barren, but, as the grand rendezvous of the Indian traders, a considerable traffic is carried on; and its situation will probably render it a place of commercial importance. It is within the line of the United States, and contains 251 inhabitants: distant about 200 miles N.N.W. from Detroit. N. lat. 45° 48' 34". W. long. 84° 30'.

MICHILLIMAKKINAK, *Little*, a river on the N.W. territory of America, which enters the S.E. side of Illinois river, by a mouth fifty yards wide, at which there are between thirty and forty small islands. It runs a N.W. course, and is navigable about ninety miles. On its banks is plenty of good timber, viz. red and white cedar, pine, maple, walnut, &c.; and here are also coal-mines.

MICHIPICOTEN, a river which runs into lake Superior, on the N.E. side of the lake. At its mouth it forms a bay of its own name; and on the W. part of the bay is a large island, so called, close to the land. On the E. side of the mouth of the above river, in N. lat. 47° 56', is Michipicoten House, belonging to the Hudson's Bay company.

MICHISCOU, the Indian and present name of the most northerly river in Vermont. It is navigable seven miles from its mouth.

MICHISCOU Tongue, a long point of land which extends southerly

foutherly into lake Champlain from the N.E. corner of Vermont, on the W. side of the bay of this name, and forms the township of Allburg.

MICHO, the name of a cove or bay of Canada, on the S. coast of the river St. Lawrence; 218 miles below Quebec. N. lat. $49^{\circ} 5'$. W. long. $66^{\circ} 30'$.

MICHOWITZ, a town of Bohemia, in the circle of Kaurzim; 12 miles W.S.W. of Kaurzim.

MICKELSO, a small island in the Baltic, E. of Aland. N. lat. $60^{\circ} 12'$. E. long. $20^{\circ} 5'$.—Alfo, a small island on the E. side of the gulf of Bothnia. N. lat. $63^{\circ} 27'$. E. long. $21^{\circ} 19'$.

MICKERY, a small island in the Frith of Forth; 8 miles N.W. of Leith. N. lat. $56^{\circ} 2'$. W. long. $3^{\circ} 17'$.

MICKLE, WILLIAM JULIUS, in *Biography*, was born, in 1734, at Langholm, in Dumfriesshire, Scotland, of which place his father was minister. After a preparatory education under his father, he was sent to the High-school at Edinburgh, where he was continued till he was sixteen years of age, when he went into the counting-house of a relation to be initiated in the art of brewing. He remained in this business a few years; but a taste for reading and poetry rendered him unfit for the necessary routine of trade. In 1763, he quitted Edinburgh for London, with a view of soliciting employment in the sea service, to which he felt a strong inclination. He took in his pocket a poem, entitled "Providence," which he contrived to get introduced to lord Lyttleton, at that period a patron of the muses, but with respect to our author it produced nothing but a complimentary correspondence. Several projects for a settlement at home and abroad, in a commercial or official situation, having failed, he at length accepted the humble situation of corrector to the Clarendon press at Oxford. In 1767, he published his poem, entitled "The Concubine," the title of which, after it had gone through three editions, was changed to "Sir Martyn," as the first title had occasioned some misconception of its nature. It was written in the style and manner of Spenser, and displays much poetical imagery, with a considerable facility of versification. Its object is to expose the evils and disgraces resulting from illicit love, terminating in concubinage. His name now became known to the public, and a way was prepared for the reception of his most considerable performance, which was the translation of the "Lusiad" of Camoens. He had, at first, doubts of the probable success of such a work, and published, as a specimen, the first book; and being encouraged by his friends and the public, he resigned his office at the Clarendon press, and took lodgings at a farm-house, in order that he might devote his whole attention to the task. His translation was finished in 1775, and published under the title of "The Lusiad, or the Discovery of India," with an introduction, containing an account of the Portuguese conquests in that country, the life of Camoens, a dissertation on the Lusiad, &c. &c. This work obtained for him a high rank among the English poets, and it is said by an able critic, that, "as far as splendour of diction and melody of versification can go to establish a poetical character, the name of Mickle has not many superiors." No metrical translator ever took greater liberties with his original than Mickle; and it is certain that his poem, and that of Camoens, have little more in common than the plan and outline. Their difference consists not only in the language, but in many circumstances and incidents of the piece. Thus Mickle has painted a storm and a naval action in three hundred lines, of which there is not the smallest vestige in the original. His suppressions are as frequent as his interpolations, of which the reader should be apprized, if he go

to compare the Portuguese poem with its English translation. His purpose was to give a poem that might live in the English language, which he has attained. Previously to the publication of the Lusiad, he had written a tragedy, entitled the "Siege of Marseilles," which being offered to Garrick, was refused as unfit for the stage. The same sentence was passed upon it by Mr. Harris and Sheridan, and he submitted, after a time, to their decision with decent fortitude. In 1779, he went out as secretary to governor Johnstone, who had been appointed to the command of the Romney man of war. He was left at Lisbon as joint-agent for prizes. Here, on account of the honour that he had done to the chief poet of the country, he received many very many flattering marks of attention, and was admitted into the Royal Academy of Lisbon at its first opening. While at the Portuguese capital, he wrote his poem of "Almada-hill, an Epistle from Lisbon," which by no means supported the reputation which he had acquired by the Lusiad. In his foreign mission he had acquired some property, and on his return he settled at Wheatley, near Oxford, where he died in 1789, leaving behind him a character for strict integrity and honour, intermixed, perhaps, with some foibles and imperfections.

MICKLE ROOE, in *Geography*, one of the smaller Shetland islands. N. lat. $60^{\circ} 30'$. W. long. $1^{\circ} 49'$.

MICKLEHAM, a village and parish situated in the hundred of Cophthorn, and county of Surrey, England. The houses are placed in a vale between Leatherhead and Dorking, and the valley is watered by the river Mole, and claims the attention of the topographer on account of the peculiar and picturesque nature of its scenery, and the many handsome seats included within its jurisdiction. On the west of the village rises a gentle hill, adorned by the handsome mansion of Norbury-park, the property of William Locke, esq. and on the east is Mickleham Down, a very fine sheep-pasture, belonging to sir Lucas Pepys, bart. Part of this Down is covered with plantations, which were begun by the late sir Cecil Bishop, about the year 1763, which serve both to shelter and ornament the seat of the proprietor, situated immediately beneath them. A part of the Roman road, called Stanes-street, can be distinctly traced not far from the house. At some distance further, to the south-east, is an eminence called Boxhill, from the vast quantity of box trees growing on its summit and side. This hill ascends abruptly from the Mole, and commands, from its summit, a very grand and extensive prospect. What is remarkable, there is a well on the top of it, the water of which stands at only fifteen feet from the surface, whereas, on another hill opposite, it is necessary to raise the water 430 feet. The Mole, which in its passage through this parish forms a very serpentine current, sinks entirely into the ground at different places, which commonly are denominated the Swallows.

The church of Mickleham is a very ancient building, and is rather remarkable in its architecture. It is built of stone, and consists of a nave, with a chancel at the east end of it, a small chapel on the north side, and a south aisle, separated from the nave by round pillars supporting semi-circular arches. The east window is adorned with handsome tracery works, and on each side of the chancel are two windows, with lancet-shaped tops within a round-headed arch, which rests upon round pillars, and is ornamented with a single row of square billet-work. At the west end rises a low square tower, strengthened by double angular buttresses, and surmounted by a pyramidal spire. The font is of solid stone, the basin having been hollowed out from it. Here are several monuments, but none of them peculiarly interesting. The living is a rectory.

According

According to the parliamentary returns of 1801, the number of inhabitants in the whole parish amounted to 389 persons, of whom 186 were males, and 203 females. The grounds of Norbury park are finely wooded, and diversified with lofty eminences. The house has long been noted for its pictures and works of art; one room is covered with paintings, by Barrett, and is much admired for its style and execution. It represents the mountain and lake scenery of Westmoreland. See Gilpin's *Western Counties*, and Manning's *History of Surrey*, edited by William Bray, esq. F. S. A. fol. vol. ii. 1809.

MICKMACKS, American Indians, who inhabit the country between the Shapody mountains and the gulf of St. Laurence, in Nova Scotia, opposite to St. John's island. These people are said to convey their sentiments by hieroglyphics, marked on the rind of the birch, and on paper, which the Romish missionaries perfectly understand. Many of them reside at the heads of the rivers in King's and Hants counties.

MICCONTRAFA, in *Counterpoint*, was long regarded as a solecism in harmony. The natural diatonic scale consisting of tone, tone, and semitone, as C D *ef*, or *ut, re, mi, fa*; G A B *c*, or *sol, la, mi, fa*; if the 4th *fa*, in the key of C, or C in the key of G, was made sharp, it would be called *tritonus*, or a dissonant series of four whole tones; which, before the ear was accustomed to crude intervals, in the infancy of counterpoint, was so offensive, that it used to be said, *Mi contra fa est diabolus*. Alluding to this in king Lear, act i. sc. 7. there is a passage which has much embarrassed the commentators: "O, these eclipses portend these divisions! *Fa, sol, la, mi*." Shakspeare, however, shews by the context, that he was well acquainted with the nature of the musical intervals contained in the *tritonus*, or sharp 4th, which, consisting of three tones without the intervention of a semitone, is extremely difficult to sing, and disagreeable to uncultivated ears when sung, if *mi* or *fa* terminate the passage.

The false 5th is only an inversion of the sharp 4th, as B F or F B, which were held in equal horror by our fore-fathers; though at present the chief beauties of melody and harmony are derived from these intervals.

MICOTSI, MOSES, in *Biography*, a learned Spanish Jew, who flourished in the 14th century, is chiefly known as author of a work, entitled "Sepher Miseroth Gadol," or "The Great Book of Precepts," which is explanatory of the commandments of the Jewish law, and which was printed at Venice in 1545. It is much applauded by father Simon, who says it is highly deserving of diligent perusal, on account of the great learning and judgment with which the author has treated the subject. Moreri.

MICOYA BAY, in *Geography*, a bay situated on the S.W. coast of Mexico, on the Pacific ocean. N. lat. 10° 18'.

MICRANTHEMUM, in *Botany*, from *μικρον*, small, and *ανθος*, a flower. Michaux Boreal-Amér. v. 1. 10. (Globifera; Gmel. Syst. Nat. Linn. v. 2. 32.)—Class and order, *Diandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Lyfimachieæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in four deep, somewhat spatulate segments; the two uppermost rather the smallest. *Cor.* scarcely longer than the calyx, of one petal, nearly bell-shaped; tube very short, smooth within; limb in four deep unequal segments, obsolete two-lipped, its upper segment smallest. *Stam.* Filaments two, incurved towards each other, with an appendage at the base; anthers of two roundish lobes. *Pist.* Germen superior, almost globular; style short, rather declined; stigma capitate, depressed,

oblique. *Peric.* Capsule nearly globular, clothed with the permanent calyx, of one cell and two valves. *Seeds* numerous, ovate, finely striated, sessile upon the central depressed receptacle.

Ess. Ch. Corolla unequally four-cleft. Stamens with an appendage at their base. Capsule of one cell and two valves. Seeds numerous. Calyx inferior, in four deep spatulate permanent segments.

1. *M. orbiculatum*. Michaux, t. 2. (Anonymus umbrosa; Walt. Carolin. 63. Globifera umbrosa; Gincl. n. 1.)—Native of damp shady places, in the woods of Carolina and Georgia, flowering in August. *Michaux.* Roots fibrous, annual? *Stems* prostrate, branched, a span long, thread-shaped, leafy, smooth like every other part of the herb. *Leaves* opposite, sessile, nearly orbicular, entire, one-fourth of an inch long, with one rib, and several nearly longitudinal veins. *Flowers* axillary, alternate, solitary, on short capillary simple stalks, not half the length of the leaves, white, the size of a small pin's head.

MICRANTHIUS, (from the same derivation as *Micranthemum*.) Wendl. Obs. 39. (see *PHYALOSTIS*); Willd. Sp. Pl. v. 3. 342.

MICRELIIUS, JOHN, in *Biography*, a very learned German Lutheran divine, was born at Catlin, in Pomerania, in the year 1597. He pursued his theological course at Stettin, and became distinguished for his industry and talents. He took his degrees, in succession, with much applause. In 1653, he made a voyage to Sweden, and received many tokens of respect, and testimonies of liberality, from queen Christina. He died in 1658, leaving behind him several works of great learning and research. Among these may be mentioned "Lexicon Philologicum;" "Lexicon Philosophicum;" "Syntagma Historiæ Mundi;" "Syntagma Hill. Ecclesiæ;" some school books, as "Arithmetica, usus Globorum, &c.;" and a vast number of "Theses," "Orations," &c.

MICROCARPÆA, in *Botany*, so named by Mr. Brown, from *μικρον*, small, and *καρπος*, fruit, the capsules of his original species being no larger than a pin's head, and the numerous seeds consequently extremely minute. Brown Prod. Nov. Holl. v. 1. 435.—Class and order, *Diandria Monogynia*. Nat. Ord. *Personateæ*, Linn. *Scrophulariææ*, Juss.

Ess. Ch. Calyx inferior, tubular, five-sided, five-cleft. Corolla two-lipped. Barren Stamens none. Capsule of two valves and two cells, with a contrary, and at length loose, partition.

1. *M. muscosa*. Br. (*Limosella diandra*; Linn. Mant. 252. Willd. Sp. Pl. v. 3. 342. *Pæderota minima*; Koenig in Retz. Obs. fasc. 5. 10. Willd. Sp. Pl. v. 1. 77.)—Leaves linear-spatulate, about as long as the flower-stalks.—Gathered by the late Dr. I. G. Koenig, in sandy, occasionally inundated, places, at the Cape of Good Hope, as well as at Madras; and by Mr. Brown in the tropical part of New Holland. This diminutive plant grows in dense patches. When examined separately, it will be found very like the European *Limosella aquatica*, though but one-fourth its size; nor can we wonder at Linnæus for having referred it, though diandrous, to the same genus; especially since Krocker has found the *aquatica* to be sometimes diandrous; see Willdenow. Mr. Brown however, finding the corolla irregular and two-lipped, and the capsule of two cells, thought himself justified in establishing the present as a distinct genus; to which we cannot but assent; though it must be observed that the real *limosella* betrays some irregularity of corolla in the incurvation of its two upper segments.—*M. muscosa* has a considerable likeness to *Montia fontana*. The whole herb is smooth. Roots fibrous, pale, probably annual. Stem creeping,

creeping, branched. *Leaves* opposite, erect, stalked, spatulate, narrow, entire; not an inch long, including their footstalks. *Flower-stalks* axillary, solitary, quadrangular at least when dry, scarcely overtopping the leaves. *Braçteas* none. *Flowers* solitary, erect; their limb pale purplish. Segments of the *calyx* broad, short, and blunt.

2. *M. cochlearifolia*. (*Pæderota cochlearifolia*; Koenig MSS. *Hedyotis maritima*; Linn. Suppl. 119. Willd. Sp. Pl. v. 1. 566.)—Leaves obovate, concave. *Flowers* nearly sessile.—Gathered by Koenig, and by his pupil Rottler, in the East Indies; we believe on the coast of Coromandel. This has the habit of the first species, but is of a much larger proportion. *Root* of long simple fibres, apparently annual. *Stems* numerous, prostrate, variously branched and divaricated, four or five inches long, slender, smooth, leafy. *Leaves* opposite, on short stalks, obovate, obtuse, entire, smooth, somewhat fleshy, rather concave, about half an inch in length, with some smaller axillary ones. *Flowers* axillary, opposite, solitary, on very short thick stalks. *Capfule* nearly globose, the size of coriander seed, pale brown, thin and brittle.

Mr. Brown points out the very near affinity of this plant to the former, from which he says it differs, in having a capsule without valves. This is indeed so far correct, that the capsule usually breaks casually at the sides; but traces of two distinct valves, each with a narrow partition from its centre, may readily be perceived, and these sometimes separate regularly at the top, in the usual way, even to the base, as we find by examining various specimens. This difficulty therefore being removed, we are glad to find a proper place for the plant in question, whose disagreement with *HEDYOTIS* we have already pointed out; see the conclusion of that article. Dr. Koenig having made it, like the former, a *Pæderota*, proves its having but two stamens, he being so rigid a Linnæan, that he usually considered the characters of the artificial classes as absolute, the orders having been, in his day, little observed.

MICROCHLOA, from *μικρος*, *small*, and *χλωρ*, *a grass*. Brown Prod. Nov. Holl. v. 1. 208.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Eff. Ch. Spike unilateral, without joints. *Calyx* single-flowered, of two nearly equal, acute, membranous valves. *Corolla* included, inverted, of two beardless hairy valves. *Stigmas* feathery.

1. *M. setacea*. Br. (*Rottboellia setacea*; Roxb. Coromand. v. 2. 17. t. 132. *Nardus indica*; Linn. Suppl. 105. Willd. Sp. Pl. v. 1. 315.)—Native of old walls, on the coast of Coromandel, and of the tropical region of New Holland. A diminutive annual grass, with a fibrous *root*, and several erect *stems*, from two to six inches high, smooth, round, and leafy. *Leaves* short, keeled, channelled, with a sheathing base. *Spikes* terminal, long, simple, very slender, a little incurved, composed of a single rank of imbricated purplish *flowers*, all directed one way. *Stamens* yellow, two or three. *Styles* purple.

MICROCORYS, from *μικρος*, *small*, and *κορυς*, *a helmet*, alluding to the shortness of the upper lip of the flower. Brown Prod. Nov. Holl. v. 1. 502.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Eff. Ch. *Calyx* semi-five-cleft. *Corolla* ringent; its concave upper lip very short; middle segment of the lower lip broadest. Two upper stamens included, the fertile lobe of their anthers smooth, the empty one bearded; two lower with deeply cloven abortive anthers.

A genus of *scrubs*, found by Mr. R. Brown in the south part

of New Holland. All the species have entire *leaves*, three in a whorl. *Flowers* axillary, solitary, either white or purple, each with two *bracteas*.

1. *M. virgata*.—Leaves linear, obtuse, smooth like the calyx. *Braçteas* deciduous. *Stem* erect, with thread-shaped branches.

2. *M. barbata*.—Leaves linear, obtuse, smooth. *Calyx* and corolla externally hairy. *Braçteas* deciduous. *Stem* diffuse.

3. *M. purpurea*.—Leaves oval-oblong, recurved at the margin; minutely downy on both sides; dotted beneath. Young branches silky. *Calyx* hoary. *Braçteas* brittle-shaped, permanent.

MICROCOS, so called by John Burmann, Thefaur. Zeyl. 159, who appears to have had in his contemplation the smallness of the berry, or drupa, and therefore the word is to be derived from *μικρος*, *small*, and *κοκκος*, *a berry*, abbreviated for the sake of harmony. Linn. Gen. 267. Schreb. 356. Willd. Sp. Pl. v. 2. 1168. Gærtner. t. 57.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Columnifera*, Linn. *Tiliaceae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five oblong, bluntish, spreading, deciduous leaves. *Cor.* Petals five, linear, equal, emarginate, rather spreading, various in size. *Nectary* none. *Stam.* Filaments numerous, capillary, the length of the calyx, inserted into the base of the germen; anthers roundish. *Pist.* Germen roundish, supported by a short five-sided column, at whose top the stamens are inserted; style cylindrical, shorter than the stamens; stigma bluntish. *Peric.* Drupa roundish. *Seed.* Nut turbinate, clothed with long capillary fibres connected with the pulp, of three close cells, filled with solitary kernels.

Eff. Ch. *Calyx* of five leaves. *Petals* five, without any separate nectaries. *Drupa* stalked, with a hairy nut of three cells.

Linnæus, after having adopted this genus from Burmann, reduced it in his *Systema Vegetabilium* to *Grewia*, from which Gærtner, who is followed by Schreber and Willdenow, again separated it. He seems to have fallen into an error in saying, v. 1. 274, that the seeds of *Grewia* have no albumen; but there are sufficient distinctions besides. (See *Grewia*.) Besides the characters in the fructification, we may add, on the score of habit, that the inflorescence of *Microcos* is paniced and terminal, that of *Grewia* axillary, and either simple or somewhat umbellate. We are enabled to strengthen the genus with two new species, in addition to the original one.

1. *M. paniculata*. Smooth *Microcos*. Linn. Sp. Pl. 735. (*M. foliis alternis oblongis acuminatis*; Burm. Zeyl. 159. t. 74. *Grewia Microcos*; Linn. Syst. Nat. ed. 12. v. 2. 602. Juss. Ann. du Mus. v. 4. 89. Ait. Hort. Kew. ed. 2. v. 3. 301. Schageri-Cottam; Rheede Hort. Malab. v. 1. 105. t. 56.)—Leaves ovate, nearly smooth.—Native of various parts of the East Indies, in a sandy soil. A *shrub* about a man's height, with alternate, round, leafy *branches*, which are a little downy when young only. *Leaves* alternate, on short roughish stalks, ovate, pointed, more or less oblique, from three to five inches long, and two broad, slightly and unequally serrated, green on both sides, furnished from the base with three ribs, but the lateral ones vanish about the middle, and are replaced by many large veins from the mid-rib, connected by an infinity of minute reticulations; both sides are a little rough to the touch, but naked, except a bristly roughness on the ribs. *Panicle* terminal, doubly or triply compound, the branches clothed with a scurfy, somewhat flattened, pubescence. *Flowers* reddish, two or three together, in a common *involucrum* of about

about seven oblong downy deciduous leaves, resembling those of the penstemon, which is less downy within. *Petals* not longer than the germens, obtuse, recurved, downy at the outside.

2. *M. tomentosa*. Downy-leaved Microcos.—Leaves elliptical, very downy beneath.—A specimen of this is preserved in the herbarium of the younger Linneus, marked *Grewia*, but without any indication of its native country. The *branch* is round, clothed with dense rusty down, as are the *footstalks*, *flower-stalks*, and backs of the *leaves*, the latter part being very soft. The *leaves* are the size of the former, but elliptical and blunt, with a short point, and obsoletely serrated chiefly towards the extremity. Their upper surface feels soft, from scarcely visible downiness. The *panicle* is much like the foregoing, but the leaves of the *involucrum* are linear, narrow, and more distant; others resembling them, but three-cleft, being scattered about the lower part of the *panicle*, so that they ought rather to be called *bracteas*.

3. *M. scabra*. Rough-leaved Microcos.—Leaves oblong, heart-shaped at the base, rough at the back.—Sent from Amboyna, by the late Mr. Christopher Smith. A larger species than either of the former; its *branches*, *stalks*, and backs of the *leaves* rough and harsh to the touch. The *leaves* are a foot long or more, four or five inches broad, pointed, obliquely heart-shaped at the base, with five radiating hispid ribs, and innumerable transverse, parallel, reticulated veins; the margin is slightly uneven; the upper surface rather shining and smooth, except the ribs; the under opaque, and minutely hispid, with starry, finally deciduous, hairs. *Panicle* ample, spreading, repeatedly branched, terminal, but attended by axillary branches, likewise doubly compound, from some of the upper leaves. *Involucral* leaves, embracing two or three flowers, dilated, membranous, downy, often palmate; the *bracteas* which resemble them, under each branch of the *panicle*, more decidedly palmate. *Flowers* the size of the two former, but much more abundant. *Petals* lanceolate, tapering at the base, as long as the calyx, hairy at their backs.

We have seen nothing of the fruit of these two last species, but their inflorescence, with the peculiar involucreal leaves or bracteas, being so unlike in all, and the structure of the flowers, as far as we can investigate it, agreeing equally well, it is presumed there can be little uncertainty about their genus, if *Microcos* be allowed that rank at all. S.

MICROCOSM, *Μικροκοσμος*; formed from *μικρος*, little, and *κοσμος*, world, a Greek term, literally signifying little world; chiefly understood of man, who is so called by way of eminence, as being an epitome of all that is wonderful in the great world, or macrocosm.

MICROCOSMETER, a name given by Dolæus to an imaginary being, which he supposes to reside in the brain, and direct all the actions.

MICROCOUSTICS, the same with microphones.

MICROGRAPHIA, MICROGRAPHY, compounded of *μικρος*, small, and *γραφειν*, description, a description of the parts and portions of objects that are too small to be viewed without the assistance of a microscope.

MICROLÆNA, in Botany, seems to be formed of *μικρος*, small, and *λανος*, wool, alluding to the little bearded stalk of the flower, within the calyx. Brown Prod. Nov. Holl. v. 1. 210.—Class and order, *Tetrandria Digynia*. Nat. Ord. *Gramina*.

Ess. Ch. Calyx single-flowered, of two minute valves. Corolla supported by a bearded stalk, longer than the calyx, double, each of two valves, smooth; those of the outer-

most nearly equal, each with a terminal awn. Nectary of two opposite scales, alternate with the valves of the corolla. Stigmas sessile, feathery.

1. *M. stipoides*. Br. (*Ehrharta stipoides*; Labill. Nov. Holl. v. 1. 91. t. 118.)—Gathered by M. Labillardiere in Van Diemen's land, and by Mr. Brown at Port Jackson.—A smooth grass, about a foot and a half high. *Stem* round, slender, simple, leafy. *Leaves* spreading, short, flat, taper-pointed, with very long sheaths, and a jagged stipula. *Panicle* a span long, capillary, drooping, simply branched. The bearded stalk on which the flower stands within the calyx, and the long awned glumes, give this grass the aspect of an *Andropogon*, or *Stipa*. The French author describes and figures six *stamens*, and therefore referred the plant to *Ehrharta*, with which it has no other character in common, nor scarcely any agreement in aspect. Mr. Brown, after repeated examinations, declares it to be certainly tetrandrous. The *stigmas* are two, sessile and feathery. *Seed* elliptic-oblong, slightly compressed, enclosed in the permanent husks of the corolla. The *nectary* is extremely minute.

MICROLEUCONYMPHÆA, one of Boerhaave's sesquipedalian names, such as he distributed plentifully among the Proteaceous family, and which is equivalent to Small-white-water-lily. He applied it to the plant now more happily termed *Hydrocharis*; see that article.

MICROLOGUS, *Μικρολογος*, from *μικρος*, parvus, and *λογος*, ratio, sermo, that which gives reasons for obscure and minute things, a minute enquiry into latent things: the title given by Guido d'Arezzo to his treatise on music, in which his system is unfolded.

The most curious part of the micrologus is the chapter "De Diaphonia, et Organi jura;" as it shews the state of music at the time it was written, and gives such specimens of the first rude attempts at harmony as may be safely pronounced authentic. See GUIDO, HEXACHORD, and COUNTERPOINT.

MICROLOMA, in Botany, from *μικρος*, small, and *λωμα*, a fringe, the five tufts of hairs, alternate with the scales, in the middle of the flower, having altogether that appearance. Brown Tr. of the Wernerian Society, v. 1. 53. (*Ceropegia*; Lamarck Illustr. t. 179.)—Class and order, *Pentandria Digynia*: Nat. Ord. *Contorta*, Linn. *Apocinea*, Juss. *Asclepiadeæ*, Brown.

Ess. Ch. Corolla pitcher-shaped, with an inflated angular tube, much longer than the limb, naked at the mouth. Scales five, inserted into the tube under each sinus, alternate with as many tufts of hair. Stamens without a crown. Anthers arrow-shaped, tipped with a membrane; masses of pollen compressed, attached by the apex, pendulous. Stigma with a small point. Follicles

A genus of twining slender shrubs, with opposite leaves, and umbels inserted between the footstalks. It is formed of the two Linnæan Cape species of *Ceropegia*, which Mr. Brown observes are widely different from the original species of that genus. See CEROPEGIA, (by mistake CEROPEGIUM).

1. *M. sagittatum*. (*Ceropegia sagittata*; Linn. Mant. 215. Lamarck fig. 1. *Cynanchum radice glandulosa, foliis angustis sinuatis, floribus urceolatis miniatis*; Burm. Afr. 36. t. 15.)—Leaves arrow-shaped, downy. Limb of the corolla rather acute.—Native of the Cape of Good Hope. Root of several oblong fleshy knobs. Stems two or three, slender, twining, somewhat branched. Leaves on shortish stalks, linear-oblong, revolute, dilated and arrow-shaped at the base. Flowers in small hairy lateral umbels, scarlet, with a sharp hairy calyx. The angles of the corolla also are downy.

2. *M. lineare*. (*Ceropegia tenuifolia*; Linn. Mant. 215. Syll. Veg. ed 14. 255. Lamarck fig. 2. *Periploca tenuifolia*; Linn. Sp. Pl. 310, β . *Cynanchum linearibus foliis acutis, floribus urceolatis rubris*; Burm. Afr. 37. t. 16. f. 1.)—Leaves linear, smooth. Limb of the corolla very blunt.—Native of the Cape of Good Hope. The root is tuberous. Habit very like the foregoing, but the leaves are more narrow, strictly linear throughout, and smooth. Flowers red, differing from the former in the very oblique and obtuse form of the segments of their limb.

Mr. Brown appears to have, by mistake, copied the Linnæan specific name *tenuiflora* instead of *tenuifolia*, which last need not have been changed, though the appellation he has chosen we confess to be more particularly expressive.

MICROMETER, an astronomical machine, which, by means of a very fine screw, serves to measure extremely small distances in the heavens; as the apparent diameters of the planets, to a great degree of accuracy.

The word comes from the Greek μικρός, *parvus*, and μέτρον, *mensura*: because a small length, e. g. an inch, is hereby divided into vast numbers of parts, e. g. in some 2800, and in others more.

This instrument is so contrived as to move a fine wire parallel to itself, in the plane of the picture of an object, formed in the focus of a telescope, and with great exactness to measure its perpendicular distance from a fixed wire in the same plane; and thus are measured small angles, subtended by remote objects at the naked eye. *E. G.* Let a planet be viewed through a telescope; and when the parallel wires are opened to such a distance as to appear exactly to touch two opposite points in the circumference of the planet, it is evident, that the perpendicular distance between the wires is then equal to the diameter of the picture of the planet, formed in the focus of the object-glasses. Let this distance, whose measure is given by the mechanism of the micrometer, hereafter described, be represented by the line *pq*, *Plate X. Optics, fig. 5*; then, since the measure of the focal distance *qL* may be also known, the ratio of *qL* to *qp*, that is, of the radius to the tangent of the angle *qLp*, will give the angle itself by a table of sines and tangents; and this angle is equal to the opposite angle *PLQ*, which the real diameter of the planet subtends at *L*, or at the naked eye. There is some controversy about the invention of the micrometer. Messrs. Auzout and Picard have the credit of it in common fame, as being the first who published it, in the year 1666; but Mr. Townley, in the Philosophical Transactions, claims it for one of our own countrymen, Mr. Gascoigne. He relates, that from some scattered papers and letters of this gentleman, he had learnt, that, before our civil wars, he had invented a micrometer, of as much effect as that since made by M. Auzout, and had made use of it for some years, not only in taking the diameters of the planets, and distances upon land, but in determining other matters of nice importance in the heavens; as the moon's distance, &c.

Mr. Gascoigne's instrument fell into the hands of Mr. Townley, who says, that by the help of it he could make above forty thousand divisions in a foot. This instrument being shewn to Dr. Hooke, he gave a drawing and description of it, and proposed several improvements in it, which may be seen in the Philosophical Transactions, Abr. vol. i. p. 217. Mr. Gascoigne divided the image of an object, in the focus of the object-glasses, by the approach of two pieces of metal, ground to a very fine edge, in the place of which Dr. Hooke would substitute two fine hairs stretched parallel to one another. Two other methods of Dr. Hooke, different from this, are described in his Posthumous Works,

p. 497, &c. An account of several curious observations which Mr. Gascoigne made by the help of his micrometer, particularly in the mensuration of the diameter of the moon and other planets, may be seen in the Phil. Transf. vol. xlvi. p. 190, where Dr. Bevis refers to an original letter of Mr. Gascoigne, to Mr. Oughtred, written in 1640—1, for an account given by the author of his own invention, &c.

Mons. de la Hire, in a discourse on the era of the inventions of the micrometer, pendulum clock, and telescope, read before the Royal Academy of Sciences in 1717, makes M. Huygens the inventor of the micrometer. That author, he observes, in his Observations on Saturn's Ring, &c. published in 1659, gives a method of finding the diameters of the planets by means of a telescope; viz. by putting an object, which he calls *virgula*, of a proper bigness to take in the distance to be measured, in the focus of the convex object-glasses: in this case, says he, the smallest object will be seen very distinctly in that place of the glass. By such means, he adds, he measured the diameters of the planets, as he there delivers them.

This micrometer, M. De la Hire observes, is so very little different from that published by the marquis de Malvasia, in his Ephemerides, three years after, that they ought to be esteemed the same: and the micrometer of the marquis differed yet less from that published four years after his by Auzout and Picard. Hence, M. De la Hire concludes, that it is to M. Huygens the world is indebted for the invention of the micrometer; without taking any notice of the claim of our countryman Mr. Gascoigne, which, however, is prior by many years to any of them.

M. De la Hire says, that there is no method more simple or commodious for observing the digits of an eclipse, than a net in the focus of the telescope. These, he says, were generally made of silken threads, and for this particular purpose six concentric circles had also been made use of, drawn upon oiled paper; but he advises to draw the circles on very thin pieces of glass, with the point of a diamond. He also gives several particular directions to assist persons in using them. In another memoir he shews a method of making use of the same net for all eclipses, by using a telescope with two object-glasses, and placing them at different distances from one another. *Ac. Par. 1701, and 1717.*

MICROMETER, *Construction and Use of the*. Wolsius describes a micrometer of a very easy and simple structure, first contrived by Kirchius, thus:

In the focus of a telescope fit a brass or iron ring *AB* (*Plate X. Optics, fig. 6.*) with female screws diametrically opposite to each other; into these insert male screws *CE* and *FB*, of such length as that they may be turned in the tube, so as to touch each other: and with this instrument very small spaces in the heavens may be accurately measured.

For when any objects, viewed through a tube, appear contiguous to the screws, if these be turned till they just touch two opposite points, whose distance is to be measured, it will be evident how many threads of the screw they are apart. To determine how many seconds answer to each thread, applying the tube towards the heavens, turn the screws till they touch two points, whose distance is already accurately known; and observe the number of threads corresponding to that interval; thus, by the rule of three, a table may be made of the seconds corresponding to the several threads; by means of which, without greater labour, the distances of any points may be determined.

The structure of another micrometer, with the manner of fitting it to the telescope, and applying it, is as follows: *ABCg* (*fig. 7.*) is a rectangular brass frame, the side *AB* being about three inches long, and the side *BC*, as likewise the

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the opposite side *A g*, about six inches; and each of the three sides about eight tenths of an inch deep: the two opposite sides of this frame are screwed to the circular plate, to be mentioned hereafter.

The screw *P*, which has exactly forty threads in an inch, being turned round, moves the plate *G D E F*, along two grooves made near the tops of the opposite sides of the frame; and the screw *Q*, having the same number of threads in an inch as *P*, moves the plate *R N M Y* along two grooves, made near the bottom of the said frame, in the same direction as the former plate moves, but with only half the velocity of that other; these screws are turned both at once, and the plates are moved along the same way, by means of a handle turning the endless screw *S*, whose threads fall in between the teeth of the pinions on the screws *P* and *Q*. And note, that two half revolutions of the endless screw *S* carry the screw *P* exactly once round.

The screw *P* turns the hand *a*, fastened to it, over a hundred equal divisions, made round the limb of a circular plate, to which the above named two opposite sides of the frame are screwed at right angles; the teeth of the pinion on the screw *P*, whose number is 5, take into the teeth of a wheel on the backside of the circular plate, whose number is 25. Again, on the axis of this wheel is a pinion of two, which takes into the teeth of another wheel, moving about the centre of the circular plate, on the outside of it, and having fifty teeth; this last wheel moves the lesser hand *b* once round the above mentioned circular plate in the $\frac{1}{25}$ th part of the time the hand *a* is moving round: for because the number of teeth in the pinion of the screw *P* is 5, and the number of teeth of the wheel this pinion moves, is 20; therefore the screw *P* moves four times round in the time that wheel is moving once round. Further, since there is a pinion of two which takes into the teeth of a wheel, whose number is 50; therefore this wheel with 50 teeth will move once round in the time that the wheel of 20 teeth moves 25 times round; and, consequently, the screw *P*, or hand *a*, must move a hundred times round in the same time as the wheel of 50 teeth, or the hand *b*, has moved once round.

Hence it follows, that if the circular plate *W*, which is fastened at right angles to the other circular plate, be divided into two hundred equal parts, the index *x*, to which the handle is fastened, will move five of those parts in the same time in which the hand *a* moves one of the hundred divisions round the limb of the other circular plate. Thus by means of an index *x*, and plate *W*, every fifth part of each of the divisions round the other plate may be known.

Further, since each of the screws *P* and *Q* have exactly forty threads in an inch; therefore the upper plate *G D E F* will move one inch while the hand *a* moves forty times round; the four-thousandth part of an inch while the hand moves over one of the divisions round the limb; and the twenty-thousandth part of an inch while the index *x* moves one part of the two hundred round the limb of the circular plate *W*: and the under plate *R N M Y* will move half an inch, the two-thousandth part of an inch, and the ten-thousandth part of an inch, the same way, in the said respective times.

Hence, if the under plate, having a large round hole in it, be fixed to a telescope, so that the frame is moveable, together with the whole instrument, except the said lower plate; and the straight smooth edge *H I*, of the fixed plate *A B I H*; as likewise the straight smooth edge *D E*, of the moveable plate *G D E F*, be perceivable through the round hole in the under plate, in the focus of the object-glass; then when the handle of the micrometer is turned, the edge *H I*, of the narrow plate *A B I H*, fixed to the frame, and *D E*, of the moveable plate, will appear through

the telescope equally to approach to, or recede from, each other.

By these edges we shall be able to measure the apparent diameters of the sun, moon, &c. the manner of doing which I take as follows:

Suppose, in looking at the moon through the telescope, you have turned the handle till the two edges *D E* and *H I* are opened, so as just to touch or clasp the moon's edges; and that there were twenty-one revolutions of the hand *a* to complete that opening: first say, at the focal length of the object-glass, which suppose ten feet, is to radius, so is one inch to the tangent of an angle subtended by one inch in the focus of the object-glass; which will be found twenty-eight minutes thirty seconds; again, because there are exactly forty threads of the screws in one inch; say, if forty revolutions of the hand *a* give an angle of $28' 30''$, what angle will twenty-one revolutions give? The answer will be, fifteen minutes eight seconds; and such was the moon's apparent diameter. And so may the apparent diameters of any other objects be taken. It must be here observed, that the divisions on the top of the plate *G D E F* are diagonal divisions of the revolutions of the screws, with diagonal divisions of inches against them; thus, as the said plate slides along, these diagonals are cut by divisions made on the edge of the narrow plate *K L*, fixed to the opposite side of the frame by means of two screws. These diagonal divisions serve for a register to count the revolutions of the screws, and to shew how many there are in an inch, or the parts of an inch.

Dr Derham tells us, that his micrometer is not, as usually, to be put into a tube, but to measure the spectra of the sun on paper (of any radius), or to measure any part of them. By this means, he can easily, and very exactly, with the help of a fine thread, take the declination of a solar spot at any time of the day; and, by his half-seconds watch, measure the distance of the spot from the sun's eastern and western limb.

A micrometer of a better sort is made in this manner: in the middle of an oblong plate of brass, (*A B*, Plate X. *Optics*, fig. 8.) there is cut an oblong hole, *abcdefj*, (to be placed in the focus of a telescope,) having a fine wire, *bc*, extended lengthways over the middle of it, at right angles, to two slender brass bars or sights *gh*, *ik*, lying cross the hole; of which *gh* is fixed to the plate *A B* by screws at *g* and *h*, but *ik* is moved parallel to *gh* by twirling a round knob *C* fixed upon one end of a long iron screw *D E*, which turns upon a tapering point at its end *D*, while its other end turns round in a hole at *E* in the centre of an index plate *E F*, fixed at right angles to the main plate *A B*. The long screw *D E* works through two hollow screws in two cubical blocks of brass, fixed behind the plate *lm*, bent square to the plate *no*, that slides upon the main plate *A B*, either backward or forward, and carries a perpendicular arm *op* extended over the hole *bc*; while *p*, the extremity of the arm *op*, slides under a brass ledge *qr*, screwed to the main plate *A B*, along the side of the hole. One side, *st*, of the moveable sight-plate *ikst*, lies over the arm *op*, being fixed to it by the flat-headed screws at *s* and *t*, the holes in the plate *st* being oblong or larger than the shanks of the screws, to give liberty for placing the edge *ik* coincident with *gh*, when carried up to it by turning the screw *D E* by the knob *C*; the part *ik*, which projects over the arm *op*, being hammered down to lie flat upon the main plate *A B*. The edge *ik*, after this adjustment, will always move parallel to the edge *gh*; its inclination to the screw *D E* being every where the same, provided the screw be straight, and the interval of the concave screws behind *lm* be sufficiently great and their motion steady. For this purpose about a quarter-

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round of a third concave screw presses upon the long screw DE at v , the block of it being fixed to the middle of a springing plate wvx ; whose extremities lying behind the blocks at l, m , not so near as to touch them, are pressed towards them with screws at w and x ; which occasions the block at v to spring upon the screw DE, and to hold it tight to the opposite side of the concave screws at l, m . To prevent any motion lengthways in the screw DE, its tapering point D turns in a hollow point at the end of an opposite screw y , which working through a fixed block at z , holds up the shoulder of the long screw DE, against the back of the index-plate, where its neck is inserted.

The two indexes upon the plate EF shew the number of revolutions and parts of a revolution of the screw DE, answering to the interval of the sights gb, ik . In the outward plate there is a circular slit $\alpha\beta\gamma$, which discovers part of the divisions upon the circumference of an inner plate, turned about a centre by two wheels and pinions within: so that for every revolution of the screw, an index EF, which shews the parts of it, one division upon the plate $\alpha\beta\gamma$, passes by a fixed point at β ; which shews the number of revolutions answering to the intervals of the sights gb, ik .

This micrometer received a very great improvement by an ingenious contrivance of the reverend Dr. James Bradley, professor of astronomy at Oxford, for turning it in its own plane about the intersection δ of the fixed sight gb , and of the transverse wire $b\delta e$, without stirring the telescope: which is thus executed. Upon the backside of the main-plate turned upwards, and here represented by the parallelogram GHIK, (*fig. 9.*) there is laid such another plate LMNO, of the same breadth and thickness but somewhat shorter; in the middle of which there is an oblong hole, answering to the other in the lower plate, but somewhat larger; being terminated at its sides by the straight lines $\epsilon\zeta, \eta\theta$, and at its ends by the concave arches $\theta\epsilon, \zeta\eta$, whose common centre is the point δ above-mentioned. The concave arch $\epsilon\theta$ slides round this centre against a concentric convex arch of an annular plate $\lambda\mu\nu$; somewhat longer than the concave arch, of the same thickness as the upper parallelogram, and strongly screwed to the under one, round that end of the hole which is nearest to the centre δ ; and at the same time the other concave arch $\zeta\eta$ slides also against another concentric convex arch $o\pi$, of another annular plate just as thick as the upper parallelogram, and strongly screwed to the under one. This convex arch $o\pi$ is shorter than the contiguous concave one $\zeta\eta$, to give room for the circular motion of the plates; which are held together by two annular plates similar to $\lambda\mu\nu$ and $o\pi$, but somewhat broader, to cover the coincident arches when laid over them, and screwed down to the respective annular plates underneath. The circular motion upon these arches about their centre δ , is gradually given to the upper parallelogram by an endless screw at ϵ , having an axis $\sigma\tau$ laid cross the end of the under parallelogram, and turning upon a point at one end, and in a collar at the other, both fixed to the under plate; while the spiral thread ϵ moves the teeth of a brass arch fixed at v , to the end of the upper parallelogram.

To hold the micrometer in the tube of a telescope, along each side of the upper parallelogram there is fixed a long brass plate about an inch broad; having its opposite sides bent contrary ways, so as to form two opposite ledges, about one-eighth of an inch broad, at right angles to the intermediate part of the plate, as represented in the figure. One of the ledges of each plate is placed inwards along the sides of the upper parallelogram, and is firmly fixed to it by several screws. The figure $\phi\chi\psi$ represents one of the equal and opposite holes cut in the sides of a square tube, through which the

micrometer is put; the notches $\phi\chi$ being made to receive the ledges of the side-plates, to keep the plate of the micrometer perpendicular to the tube at a just distance from the object-glasses. Which distance being once determined by trials, as above explained, must be kept invariable in all observations, by stops or pins, if the tube consists of two or more joints that draw in and out.

The Measures of the Micrometer.

	Inches.
The length of the plate A B	8.0
Its breadth M N	3.6
Its thickness	0.2
Length of the hole $b\epsilon$	3.5
Its breadth $g b = \delta e$	2.2
Breadth of the hole in the other plate at $\zeta\eta$	2.6
Length of the screw D E	5.5
Its thickness	0.3
The line A b	1.6
The interval $l m = w x$	3.0
Length of the side cheeks	4.5
Their breadth	0.8
Their ledges	0.2
Diameter of the index-plate	3.1
Its thickness (being double with two wheels within)	0.3
The greatest opening of the sights $g b, i k = \delta e$	2.2
Threads of the screw in an inch, 40	
The inch is divided by the index-plates into 40 times 40, or 1600 equal parts. Instead of the brass sights $g b, i k$, two others, with parallel wires a , may be screwed on at pleasure.	

When the sight-plates are made to coincide, the two indexes of the revolutions and their parts must be set to the beginning of the numerations upon the index-plates. Then as the sights are opened, it is evident from the make of a screw, that the numbers of revolutions will be as the intervals of the sights, and consequently as the angles subtended by them at the centre of the object-glasses; the intervals being insensibly different from the arches that measure these small angles. Therefore when any one angle corresponding to a given number of revolutions, is determined by experiment, an angle corresponding to any other number of revolutions may be found by the rule of three. And thus may tables be made to shew by inspection the number of minutes and seconds in an angle answering to any given number of revolutions and parts.

To determine some one angle, the larger the better, because the same error in the determination will be proportionably smaller in a given angle deduced from it; fix the telescope upon any known star in the equator, or very near it, and open the sights to their utmost limit and note the number of revolutions of the screw. Then by a pendulum-clock observe the interval of time in the star's transit over the given interval of the sights, and having turned it into minutes and seconds of an arch, they are the measure of the angle required. But if the star be remote from the equator, the number of minutes and seconds thus found, must be diminished in the ratio of the radius of the sine of the star's distance from the pole. To this micrometer Dr. Bradley applied an ingenious contrivance, by which it is adapted for taking the difference of right ascension and declination of such objects as are at a greater distance than the telescope will take in at once, but which pass through the aperture of it at different times. Let ABC (*fig. 10.*) represent a flat ring of brass, fixed in the focus of the telescope; and abc a smaller

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smaller concentric ring lodged in a circular groove turned within the larger, and kept in the groove by three small plates of brass fixed to the outward ring, and extended over the edge of the inner one. Upon the inner ring is fixed a concentric arch of a wheel *de*, having teeth cut in its convexity, which are driven round by the threads of an endless screw, whose axis *DEF* turns in a collar at *E*, and upon a point at *F*, both fixed to the outward ring. The hairs *gb*, *ik*, cross at right angles in *f*, the centre of the rings; and when the telescope is so fixed that the image of the star falls upon *f*, let it move along any line *fg*, and by turning the screw *DEF*, and by consequence the hair *fk*, about the fixed point *f* till it touches the star at *g*, it will then coincide with the tract of the star's motion; and then all other stars will move parallel to it as was required. To find the difference of declination of two stars, he observes the times of their appulses to the edges of two slender brass bars *gio*, *gkp*, fixed to the inner ring, and equally inclined to its diameter *gb* in such angles that the perpendiculars *fi*, *fk*, on each side of *fg*, shall be severally equal to half *fg*; and consequently that the whole base *ik*, of the equicrural triangle *igk*, shall be equal to its perpendicular height *fg*; and by consequence that the difference of any two bases *ifk*, *lmn*, shall be equal to *fm*, the difference of their heights; so that the difference of the times of the transits of two stars over these bases, may give the difference of their declinations. Smith's Optics, art. 876, &c.

M. Cassini first made use of four cross hairs or threads, intersecting one another at half right angles, for determining the difference of right ascensions and declinations of objects near the same parallel: but the micrometer, according to its latter improvements, will answer this purpose with greater exactness. Dr. Maskelyne has published directions for the use of it, extracted from Dr. Bradley's papers, in the Philos. Transf. vol. lxii. art. 6. p. 46, &c.

A considerable improvement with regard to the micrometer, was communicated to the Royal Society, in 1743, by Mr. Servington Savery, an account of which, extracted from the minutes by Mr. Short, was published in the Phil. Transf. for 1753, vol. xlviii. art. 26. The first hint of such a micrometer was suggested by M. Roemer, in 1675; and M. Bouguer proposed a similar construction to that of Mr. Savery, in 1748, for which see HELIOMETER. The late Mr. Dollond made a farther improvement in this kind of micrometer, an account of which was given to the Royal Society by Mr. Short, and published in the Phil. Transf. vol. xlviii. art. 27. Instead of two object glasses, he used only one, which (after having been truly ground and well centered) he neatly cut into two semi-circles, and fitted each semi-circle in a metal frame, so that their diameters sliding in one another, by means of a screw, may have their centres so brought together as to appear like one glass, and so form one image; or by their centres receding, may form two images of the same object: it being a property of such glasses, for any segment to exhibit a perfect image of an object, although not so bright as the whole glass would give it. If proper scales are fitted to this instrument, shewing how far the centres recede, relative to the focal length of the glass, they will also shew how far the two parts of the same object are asunder, relative to its distance from the object glass; and consequently give the angle under which the distance of the parts of that object are seen. This divided object-glass micrometer, which was applied by the late Mr. Dollond to the object end of a reflecting telescope, has been with equal advantage adapted by his son to the end of an achromatic telescope, is so easy of use, and affords so large a scale, that it is generally looked upon by astronomers as the most conve-

ment and exact instrument for measuring small distances in the heavens. However, the common micrometer is peculiarly adapted for measuring differences of right ascension, and declination of celestial objects, but less convenient and exact for measuring their absolute distances; whereas the object-glass micrometer is peculiarly fitted for measuring distances, but has been generally supposed improper for measuring differences of right ascension and declination. But Dr. Maskelyne has found that the latter may be applied with very little trouble, and small additional expence to this other purpose as well as the former; and he has furnished the directions necessary to be followed when it is used in this manner. The addition requisite for this purpose is a cell, containing two wires, intersecting each other at right angles, placed in the focus of the eye-glass of the telescope, and moveable round about, by the turning of a button. For the description of this apparatus, together with the method of applying and using it, we shall refer to Dr. Maskelyne's paper on the subject, in the Phil. Transf. vol. lxi. part ii. art. 49. p. 536.

After all, the use of the object-glass micrometer is attended with difficulties, arising from the alterations in the focus of the eye, which are apt to cause it to give different measures of the same angle at different times. In order to obviate these difficulties, Dr. Maskelyne, in 1776, contrived a prismatic micrometer, or a micrometer consisting of two achromatic prisms, or wedges, applied between the object-glass and eye-glass of an achromatic telescope, by moving of which wedges nearer to, or farther from, the object-glass, the two images of an object produced by them appeared to approach to or recede from each other, so that the focal length of the object-glass becomes a scale for measuring the angular distance of the two images. The rationale and use of this micrometer are explained in the Phil. Transf. vol. lxxvii. part ii. art. 36. p. 799, &c. A similar invention by the abbé Rochon, and improved by the abbé Boscovich, was also communicated to the Royal Society, and published in the same volume of the Transactions, art. 35. p. 789, &c.

Mr. Ramsden, an ingenious optician, has described two new micrometers, which he has contrived with a view of remedying the defects of the object-glass micrometer. One of these is a catoptric micrometer, which, beside the advantage it derives from the principle of reflection, of not being disturbed by the heterogeneity of light, avoids every defect of other micrometers, and can have no aberration, nor any defect arising from the imperfection of materials, or of execution; as the extreme simplicity of its construction requires no additional mirrors or glasses to those required for the telescope; and the separation of the image being effected by the inclination of the two specula, and not depending on the focus of any lens or mirror, any alteration in the eye of an observer cannot affect the angle measured. It has peculiar to itself the advantages of an adjustment, to make the images coincide in a direction perpendicular to that of their motion; and also of measuring the diameter of a planet on both sides of the zero, which will appear no inconsiderable advantage to observers, who know how much easier it is to ascertain the contact of the external edges of two images than their perfect coincidence. A (fig. 11.) represents the small speculum of a reflecting telescope of Cassegrain's construction, to which this micrometer is adapted, divided into two equal parts; one of which is fixed on the end of the arm *B*; the other end of the arm is fixed on a steel axis *X*, which crosses the end of the telescope *C*. The other half of the mirror *A* is fixed on the arm *D*, which arm at the other end terminates in a socket *y*, that turns on the axis *X*; both arms are prevented from bending by the braces, *a, a*. *G* represents a double screw, having one part, *e*, cut into double

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double the number of threads in an inch to that of the part g ; the part e having a hundred threads in one inch, and the part g fifty only. The screw, e , works in a nut F , in the side of the telescope, while the part g turns in a nut H , which is attached to the arm B ; the ends of the arms B and D , to which the mirrors are fixed, are separated from each other by the point of the double screw pressing against the flud b , fixed to the arm D , and turning in the nut H on the arm B . The two arms, B and D , are pressed against the direction of the double screw, $e g$, by a spiral spring within the part n ; by which means all shake or play in the nut H , on which the measure depends, is entirely prevented.

From the difference of the threads on the screw at e and g , it is evident that the progressive motion of the screw through the nut will be half the distance of the separation of the two halves of the mirror, and consequently the half mirrors will be moved equally in contrary directions from the axis of the telescope C .

The wheel V , fixed on the end of the double screw, has its circumference divided into 100 equal parts, and numbered at every fifth division with 5, 10, &c. to 100; and the index, I , shews the motion of the screw with the wheel round its axis, while the number of revolutions of the screw is shewn by the divisions on the same index. The steel screw, R , may be turned by the key S , and serves to incline the small mirror at right angles to the direction of its motion.

The other micrometer, invented and described by Mr. Ramsden, is suited to the principle of refraction. This micrometer is applied to the erect eye-tube of a refracting telescope, and is placed in the conjugate focus of the first eye-glass; in which position, as the image is considerably magnified before it comes to the micrometer, any imperfection in its glass will be magnified only by the remaining eye-glasses, which in any telescope seldom exceeds five or six times; and besides, the size of the micrometer glass will not be the $\frac{1}{100}$ th part of the area which would be required, if it were placed at the object-glass; and yet the same extent of scale is preserved, and the images are uniformly bright in every part of the field of the telescope. This micrometer is represented in *Plate XI. Optics, fig. 1.* A is a convex or concave lens divided into two equal parts by a plane across its centre; one of these semi-lenses is fixed in a frame B , and the other in the frame E , which two frames slide on a plate H , and are pressed against it by thin plates, a, a : the frames, B and E , are moved in contrary directions by turning the button D ; L is a scale of equal parts on the frame B ; it is numbered from each end towards the middle with 10, 20, &c. There are two verniers on the frame E , one at M , and the other at N , for the conveniency of measuring the diameter of a planet, &c. on both sides of the zero. The first division on both these verniers coincides at the same time with the two zeros on the scale L ; and, if the frame is moved towards the right, the relative motion of the two frames is shewn on the scale L by the vernier M ; but if the frame B be moved towards the left, the relative motion is shewn by the vernier N .

This micrometer has a motion round the axis of vision, for the conveniency of measuring the diameter of a planet, &c. in any direction, by turning an endless screw F , and the inclination of the diameter measured with the horizon is shewn on the circle, g , by a vernier on the plate V . The telescope may be adjusted to distinct vision by means of an adjusting screw, which moves the whole eye-tube with the micrometer nearer or farther from the object-glass, as telescopes are generally made; or the same effect may be pro-

duced in a better manner, without moving the micrometer, by sliding the part of the eye-tube m on the part n , by help of a screw or pinion. The micrometer is made to take off occasionally from the eye-tube, that the telescope may be used without it. *Phil. Transf. vol. lxxix. part ii. art. 27.*

Dr. Herschel has applied a lamp micrometer to Sir Isaac Newton's reflecting telescope. (*See Phil. Transf. vol. lxxii. p. 165, &c. and vol. lxxiii. p. 5, &c.*) Two moveable lamps, the light of which comes through two small holes, are placed at a convenient distance from the telescope, in the direction at which you look at the image. These points of light are looked at by the left eye, and brought, e, g , to the opposite sides of a planet looked at by the right eye; and by measuring their distance from each other, and from the eye, the angle under which the magnified diameter appears will be known, which, divided by the magnifying power of the telescope, gives the apparent diameter required. The construction of this micrometer is as follows: $ABCGFE$ (*Plate XI. Optics, fig. 5.*) is a stand nine feet high, upon which a semi-circular board, $q b o g p$, is moveable upwards or downwards, in the manner of some fire-screens, as occasion may require, and is held in its situation by a peg, p , put into any one of the holes of the upright piece AB . This board is a segment of a circle of fourteen inches radius, and is about three inches broader than a semi-circle, to give room for the handles, rD, eP , to work. The use of this board is to carry an arm L , thirty inches long, which is made to move upon a pivot at the centre of the circle, by means of a string, which passes in a groove upon the edge of the semi-circle $p g o b q$; the string is fastened to a hook at o , (not expressed in the figure, being at the back of the arm L), and passing along the groove from $o b$ to q , is turned over a pulley at q , and goes down to a small barrel e , within the plane of the circular board, where a double-jointed handle, eP , commands its motion. By this contrivance we see the arm, L , may be lifted up to any altitude from the horizontal position to the perpendicular, or be suffered to descend by its own weight below the horizontal to the reverse perpendicular situation. The weight of the handle, P , is sufficient to keep the arm in any given position; but if the motion should be too easy, a friction spring applied to the barrel will moderate it at pleasure.

In front of the arm, L , a small slider, about three inches long, is moveable in a rabbet from the end L towards the centre backwards and forwards. A string is fastened to the left side of the little slider, and goes towards L , where it passes round a pulley at m , and returns under the arm from m, n , towards the centre, where it is led in a groove on the edge of the arm, which is of a circular form, upwards to a barrel (raised above the plane of the circular board) at r , to which the handle, rD , is fastened. A second string is fastened to the slider, at the right side, and goes towards the centre, where it passes over a pulley n , and the weight, w , which is suspended by the end of this string, returns the slider towards the centre, when a contrary turn of the handle permits it to act.

a and b are two small lamps, two inches high, one inch and a half in breadth, by one inch and a quarter in depth. The sides, back, and top, are made so as to permit no light to be seen, and the front consists of a thin brass sliding door. The flame in the lamp, a , is placed three-tenths of an inch from the left side, three-tenths from the front, and half an inch from the bottom. In the lamp b , it is placed at the same height and distance, measuring from the right side. The wick of the flame consists only of a single very thin lamp-cotton thread; for the smallest flame being sufficient; it is easier to keep it burning in so confined a place. In the

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top of each lamp must be a little slit, lengthways, and also a small opening in one side near the upper part, to permit air enough to circulate to feed the flame. To prevent every reflection of light, the side opening of the lamp *a* should be to the right, and that of the lamp *b* to the left. In the sliding door of each lamp is made a small hole, with the point of a very fine needle, just opposite the place where the wicks are burning; so that when the sliders are shut down, and every thing dark, nothing shall be seen but two fine lucid points of the size of two stars of the third or fourth magnitude. The lamp, *a*, is placed so that its lucid point may be in the centre of the circular board, where it remains fixed. The lamp, *b*, is hung to the little slider, which moves in the rabbet of the arm, so that its lucid point, in a horizontal position of the arm, may be on a level with the lucid point in the centre. The moveable lamp is suspended upon a piece of brass, fastened to the slider by a pin exactly behind the flame upon which it moves as a pivot. The lamp is balanced at the bottom by a leaden weight, so as always to remain upright, when the arm is either lifted above, or depressed below, the horizontal position. The double-jointed handles, *rD*, *cP*, consist of light deal rods, ten feet long, and the lowest of them may have divisions, marked upon it near the end *P*, expressing exactly the distance from the central lucid point in feet, inches, and tenths.

From this construction we see, that a person at a distance of ten feet may govern the two lucid points, so as to bring them into any required position south or north preceding or following, from 0 to 90°, by using the handle *P*, and also to any distance from six-tenths of an inch to five or six and twenty inches, by means of the handle *D*. If any reflection or appearance of light should be left from the top or sides of the lamps, a temporary screen, consisting of a long piece of paste-board, or a wire-frame covered with black cloth, of the length of the whole arm, and of any required breadth, with a slit of half an inch broad in the middle, may be affixed to the arm by four bent wires, projecting an inch or two before the lamps, situated so that the moveable lucid point may pass along the opening left for that purpose.

Fig. 6. represents part of the arm *L*, half the real size; *S*, the slider; *m*, the pulley, over which the cord, *xy z*, is returned towards the centre; *v*, the other cord going to the pulley, *n*, of *fig. 5*; *R*, the brass piece moveable upon the pin *c*, to keep the lamp upright. At *R* is a wire rivetted to the brass piece, upon which is held the lamp by a nut and screw. *Figs. 7, and 8,* represent the lamps, *a, b*, with the sliding doors open, to shew the situation of the wicks. *W* is the leaden weight, with a hole, *d*, in it, through which the wire *R*, of *fig. 6*, is to be passed, when the lamp is to be fastened to the slider *S*. *Fig. 9.* represents the lamp *a*, with the sliding door shut; *l*, the lucid point; and *ik*, the openings at the top, and *s* at the sides, for the admission of air.

Every ingenious artist will soon perceive that the motions of this micrometer are capable of great improvement, by the application of wheels and pinions, and other well known mechanical resources; but, as the principal object is only to be able to adjust the two lucid points to the required position and distance, and to keep them there for a few minutes, while the observer goes to measure their distance, it will not be necessary to say more upon the subject.

Mr. Smeaton's equatorial micrometer, together with its use in an observation of a transit of Mercury, is described and exhibited in the *Phil. Trans.* vol. lxxvii. art. 33. We have the description of a micrometer for taking the angle of position, with drawings for illustrating its construction, as

it was executed by Messrs. Nairne and Blunt, in a paper by Dr. Herschel, *Phil. Trans.* vol. lxxi. p. 500, and a further account of its use and the mode of improving it by Dr. Herschel, *Phil. Trans.* vol. lxxxv. p. 46. Mr. Troughton's micrometer is applied to the eye-piece of a telescope for measuring exceedingly small angles, as the diameter of the heavenly bodies, &c. *Fig. 2.* is an orthography of this instrument projecting endways; *fig. 3.* is a section of the box containing the wires; and *fig. 4.* a section lengthways: the same letters, as far as they can, are used in all the figures. *Figs. 2 and 4.* A is an eye-tube containing a convex lens at each end; this slides in another tube, *dd*, so as to adjust the glass to distinct vision of the wire; the tube, *dd*, is screwed into another, *bb*, which is much larger, through this a thin long box, *DDD*, containing the wire slides. The micrometer is screwed to the telescope by a male screw, *cc*, (*fig. 4.*) in the same piece with which is a circular plate, *ff*, cut all round with fine teeth; this plate fits against the flat bottom of the box, *b*, and turns round concentrically with it by means of a ring, *k*, fitting into a conical hole in the centre of the plate, *ff*, and screwed to the box; a small endless screw, *h*, (*fig. 2.*) turning in two brass collars screwed to the box, *b*, works in the teeth cut round the plate, *f*, and by that means when the milled head on the arbor of the endless screw is turned, it turns the eye-tube and box, *DD*, round, to bring it to any convenient position for measuring the angles required; the box containing the wires is shewn open in *fig. 3*, it containing two frames, *bbb* and *lll*, one sliding within another, which moves in the box, without lateral shake, yet fitted so as to slide easily backwards and forwards in the box, by the screws *m* and *n*, in the same manner as the microscope in the upper part of the same plate; *o* and *p* are springs to counteract the screws and make the motion pleasant. A wire is stretched across the frame, *bb*, at right angles to its sides, and another of the same size is fixed across the slider, *lll*, exactly parallel to the former; a small quantity of the under side of the latter is cut away, and its wire is fixed in another plane to the wire of *bbb*, so that the wires can pass each other without touching, but as near as possible; when they are placed by their screws over each other, and viewed through the eye-tube, they appear but as one wire: the divided circle, *a*, on the nuts of screws are then slipped round, without the screw, to bring the first division on them to the index *l*; the instrument is now adjusted for observing any angle, it is screwed to the telescope, and by the endless screw, *n*, (*fig. 2.*) the micrometer is turned round so as to bring a fixed wire *x*, which is perpendicular to the others, to cover the two objects; the two wires are then separated by turning either of the nuts, *F*, until the wires include the angle to be measured: the whole box (*fig. 3.*) of the micrometer slides through the tube, in the direction of its length, to follow any moving object. When the observation is completed it is read off by a scale of notches in the box, (*fig. 3.*) determining the number of revolutions the screw has made, and the divisions pointed out on the circles, *a*; by the indexes, *l, l*, the number of aliquot parts is denoted; the circular plate, *ff*, is divided into degrees, as shewn in *fig. 2*, and it is by this that the angle line measured makes with the horizon is registered.

The circles are divided in one hundred parts, and have no determinate value in angular measurement, but their value is determined experimentally by observing through the telescope, it is applied to the diameter of the sun, or any other body whose angular measure has been previously and accurately determined by some other divided instrument,

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and from this the angle given by each observation is calculated.

Mr. Cavallo has contrived a micrometer of very simple and easy construction. It consists of a small semi-transparent scale or slip of mother-of-pearl, about the 20th part of an inch broad, and of the thickness of common writing paper. It is divided into a number of equal parts by means of parallel lines, every fifth and tenth of which divisions is a little longer than the rest.

This micrometer, or divided scale, is situated within the tube at the focus of the eye-lens of the telescope, where the image of the object is formed, and with its divided edge passing through the centre of the field of view; though this is not absolutely necessary. It is immaterial whether the telescope be a refractor or a reflector, provided the eye-lens be convex, and not concave, as in the Galilean telescope.

The simplest way of fixing it, is to stick it upon the diaphragm, which generally stands within the tube, at the focal distance of the eye-lens.

By looking through the telescope, the image of the object and the micrometer will appear to coincide: hence the observer may easily see how many divisions of the latter measure the length or breadth of the former; and knowing the value of the divisions of the micrometer, he may easily determine the angle which is subtended by the object.

There are several methods of ascertaining the value of the divisions of a micrometer in a given telescope. The following is one of the easiest.

Direct the telescope to the sun, and observe how many divisions of the micrometer measure its diameter exactly; then take out of the Nautical Almanack the diameter of the sun for the day in which the observation is made; divide it by the above-mentioned number of divisions, and the quotient is the value of one division of the micrometer. Thus, suppose that $26\frac{1}{2}$ divisions of the micrometer measure the diameter of the sun, and the Nautical Almanack gives for the measure of the angle, which is subtended by the same diameter, $31' 22''$, or (by reducing it all into seconds) $1882''$. Divide $1882''$ by 26.5 , and the quotient, neglecting a small remainder, is $71''$, or $1' 11''$; which is the value of one division of the micrometer; the double of which is the value of two divisions; the treble is the value of three divisions; and so forth.

This mother-of-pearl micrometer may be applied to a microscope; and it will thus serve to measure the linear dimensions of the object; and the value of its divisions are ascertained by placing an object of a known dimension before the microscope, and by observing how many divisions of the micrometer measure its magnified image; for instance, place a piece of paper, which is exactly one-tenth of an inch long, before the microscope, and if you find that 50 divisions of the micrometer measure its magnified image, you may conclude that each division is equal to, or rather denotes an extension of the 500th part of an inch in the object; for if 50 divisions measure one-tenth, 500 divisions must measure the whole inch; &c. Cavallo's Philosophy, vol. iii. Phil. Transf. vol. lxxxii. art. 19.

The micrometer has not only been applied to telescopes, and employed for astronomical purposes; but there have been various contrivances for adapting it to microscopical observations. M. Leeuwenhoek's method of estimating the size of small objects was by comparing them with grains of sand, of which a hundred in a line took up an inch. These grains he laid upon the same plate with his objects, and viewed them at the same time. Dr. Jurin's method was similar to this; for he found the diameter of a piece of fine

silver wire, by wrapping it as close as he could about a pin, and observing how many rings made an inch; and he used this wire in the same manner as Leeuwenhoek used his sand. Dr. Hooke used to look upon the magnified object with one eye, while, at the same time, he viewed other objects, placed at the same distance, with the other eye. In this manner he was able, by the help of a ruler, divided into inches and small parts, and laid on the pedestal of the microscope, to cast, as it were, the magnified appearance of the object upon the ruler, and thus exactly to measure the diameter which it appeared to have through the glass; which being compared with the diameter as it appeared to the naked eye, easily shewed the degree in which it was magnified. A little practice, says Mr. Baker, will render this method exceedingly easy and pleasant.

Mr. Martin, in his Optics, recommends such a micrometer for a microscope as had been applied to telescopes; for he advises to draw a number of parallel lines on a piece of glass with the fine point of a diamond, at the distance of $\frac{1}{40}$ th of an inch from one another, and to place it in the focus of the eye-glass. By this method, Dr. Smith contrived to take the exact draught of objects viewed by a double microscope; for he advises to get a lattice, made with small silver wires or squares, drawn upon a plain glass by the strokes of a diamond, and to put it into the place of the image formed by the object-glass. Then by transferring the parts of the object, seen in the squares of the glass or lattice, upon similar corresponding squares drawn on paper, the picture may be exactly taken. Mr. Martin also introduced into compound microscopes another micrometer consisting of a screw. See both these methods described in his Optics, p. 277.

The most minute and accurate division of any scale which the editor has ever seen, was performed by Mr. Coventry of Southwark. The micrometers of his construction are parallel lines drawn on glass, ivory, or metal, from the 10th to the 10,000th of an inch. These may be applied to microscopes, for measuring the size of minute objects, and the magnifying power of the glasses; and to telescopes, for measuring the size and distance of objects, and the magnifying power of the instrument. For measuring the size of an object in a single microscope, lay it on a micrometer, whose lines are seen magnified in the same proportion with it, and give at one view the real size of the object. For measuring the magnifying power of the compound microscope, the best and most ready method is the following. On the stage in the focus of the object-glass, lay a micrometer, consisting of an inch divided into one hundred equal parts; count how many divisions of the micrometer are taken into the field of view; then lay a two-foot rule parallel to the micrometer: fix one eye on the edge of the field of light, and the other eye on the end of the rule, which move, till the edge of the field of light and the end of the rule correspond; then the distance from the end of the rule to the middle of the stage will be the half of the diameter of the field: *e. gr.* if the distance be ten inches, the whole of the diameter will be twenty, and the number of the divisions of the micrometer contained in the diameter of the field, is the magnifying power of the microscope. Thus, suppose the number of divisions seen in the micrometer to be $\frac{5}{100}$ ths, and that the diameter of the field measures with the rule twenty inches; the $\frac{5}{100}$ th of 20 inches is 40, which is the diameter of the field; $40 \times 40 = 1600$ the superficies, and $1600 \times 40 = 64000$, the magnified cube of the object: in like manner each object-glass or magnifier must be proved, and a table kept of their several magnifying powers. For measuring the height and distance of objects by a micrometer

in the telescope, see TELESCOPE. Mr. Adams has applied a micrometer, which instantly shews the magnifying power of any telescope.

MICROPHONES, instruments contrived to magnify small sounds, as microscopes do small objects.

MICROPUS, in Botany, derived from *μικρο*, small, and *πούς*, a foot; possibly from an allocation of ideas with *Leontopodium*, Lion's-foot, as this genus is nearly assimilated in habit to the *Filago Leontopodium* of Linnæus. It was even supposed by Dr. Sibthorp to be the real *Asplenium* of Dioscorides; (see *LEONTORIUM*).—Linn. Gen. 451. Schreb. 588. Willd. Sp. Pl. v. 3, 2388. Mart. Mill. Diet. v. 3. Ait. Hort. Kew. ed. 1. v. 3, 280. Juss. 185. Lamarck Illustr. t. 694. Gærtn. t. 164. (Gnaphalodes; Pournet. t. 261.)—Class and order, *Syngenesia Polygamia Necessaria*. Nat. Ord. *Composita Nucamentaceæ*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common calyx* double; the outer of five, slender, small, obsolete leaves, at the base of the inner, which is very large, and composed of five, loose, distinct, helmet-shaped, compressed leaves, conniving longitudinally at the margin. *Cor.* compound, with ten perfect florets in the disk, and five female ones in the radius; the former of one petal, with five teeth, erect; the latter without any petal. *Stam.* (in the perfect florets) Filaments five, bristle-shaped, very short; anthers cylindrical, tubular, as long as the florets. *Pistl.* (in the same florets) Germen obsolete; style thread-shaped, longer than the filament; stigma obsolete: (in the female ones) Germen obovate, compressed, concealed within each scale of the common inner calyx; style from the inner side of the germen, bristle-shaped, turned towards the perfect florets, the length of the calyx; stigma cloven, slender, pointed. *Peric.* none, except the common inner calyx enlarged and hardened. *Seeds* (in the perfect flowers) none: (in the female ones) solitary, obovate, inclosed each in its appropriate leaflet of the inner calyx. *Recept.* furnished with acute, small scales, which separate the seeds of the females, but not the florets of the disk.

Ess. Ch. Receptacle fealy. Down none. Calyx double. Radius without a corolla. Female florets inclosed by the scales of the common inner calyx.

1. *M. supinus*. Linn. Sp. Pl. 1313. Cavan. Ic. v. 22. t. 35.—Stems prostrate. Leaves opposite, obovate-wedge-shaped.—A native of Portugal, Spain, Italy, and the Levant, flowering from May to September. Introduced into Chelsea garden in 1759, by Mr. Philip Miller.—*Root* annual, somewhat tapering, small, fibrous. *Stems* trailing, numerous, three or four inches long, covered with a sort of silvery nap, as indeed is the whole plant. *Leaves* in pairs, generally opposite, or nearly so, connate, plaited, three-nerved. *Flowers* axillary, sessile, from the base to the top of the stem, minute, in small tufts, white and very downy. *Seeds* ovate, brown.

2. *M. erectus*. Linn. Sp. Pl. 1313. Læf. It. Hisp. 166. t. 1. f. 5.—Stems upright. Leaves alternate, lanceolate.—A native of the East, as well as of France, Italy, and Switzerland.—*Root* annual, fibrous. *Stems* erect, branched, extremely downy. *Leaves* alternate, narrower and more woolly than in the last, as is the whole plant, even the flowers which are sessile, in axillary tufts.

MICROSCOPE, *Μικροσκοπεῖον*, formed of *μικρος*, small, and *σκοπεῖον*, I consider; an optical instrument, by means of which very minute objects are represented exceedingly large, and viewed very distinctly, according to the laws of refraction or reflection.

Microscopes are properly distinguished into simple, or single; and compound, or double.

Microscopes, *Single*, are those which consist of a single lens, or a single spherule.

Microscopes, *Compound*, consist of two or more lenses duly combined. As optics have been improved, other varieties have been contrived, in the sort of microscope; hence we have *resting* microscope, *water* microscope, &c. Each of these two kinds has its peculiar advantage: for a single glass shews the object nearer at hand, and rather more distinct; and a combination of glasses presents a larger field, or, in other words, exhibits more of an object equally magnified, at the view. As each of these has its advantages, each of them has had its advocates, at least in practice. M. Leeuwenhoek never used any but single microscope; and, on the contrary, Dr. Hooke made all his observations with double ones.

When, and by whom, microscopes were first invented, is not certainly known. Huygens tells us, that one Drebell, a Dutchman, had the first microscope, in the year 1621, and that he was reputed the first inventor of it: though F. Fontana, a Neapolitan, in 1646, claims the invention to himself, but dates it from the year 1618. As a telescope inverted is a microscope, the discovery might easily enough have arisen from thence.

Nothing more is certain concerning microscopes, than that they were first used in Germany about the year 1621. According to Borellus, they were invented by Zacharius Jansen, in conjunction with his son, who presented the first microscope they had constructed to prince Maurice, and Albert, archduke of Austria. William Borell, who gives this account in a letter to his brother Peter, says, that when he was ambassador in England, in 1619, Cornelius Drebell shewed him a microscope, which he said was the same that the archduke had given him, and had been made by Jansen himself. Borellus de vero Telescopii inventore, p. 35. See LENS.

MICROSCOPES, *Foundation and Theory of Single*. If an object AB (Plate XII. Optics, fig. 1.) be placed in the focus of a small convex lens, or a simple microscope DE, and the eye be applied close to the other side of the microscope, the object will be seen distinct, in an erect situation, and magnified in the ratio of the distance of the focus to the distance at which objects are to be placed to be seen distinctly by the naked eye.

For the object A B being placed in the focus of the convex lens DE, the rays issuing from the several points of it, after refraction, will be parallel to each other: consequently, the eye will see it distinctly, by virtue of what is proved under the word TELESCOPE.

Further, since one of the rays A F, proceeding from the point A, after refraction, becomes parallel to the incident ray; and therefore, setting aside the thickness of the lens, is found directly against it; and the same holds true of all the other rays carried to the eye; the rays A F and B F, to which the rest coming from A and B are parallel, will enter the eye in the same manner as if they entered without passing through the lens; and will therefore appear erect, as if the lens were away.

Lastly, it is manifest, that the object A B will be seen under the same angle as if viewed by the naked eye: but since it appears very distinct, whereas to the naked eye, at the same distance, it would appear extremely confused; it is the same thing as if the object should seem removed to the distance F H, at which it is viewed with equal distinctness, and under the same angle: the diameter of the object A B, therefore, will be to the apparent diameter I K, as F C to F H, i. e. as the distance of the focus of the lens to the distance at which an object is to be placed, in order to view it distinctly. Since, therefore, the interposition of the glass

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has no other effect than to render the appearance distinct, by helping the eye to increase the refraction of the rays in each pencil, it is plain that the greater apparent magnitude is entirely owing to a nearer view than could be taken by the naked eye.

Huygens, in *Dioptrics*, prop. lix. p. 222, takes it for granted, that an object, seen with the naked eye, is then in its utmost distinctness when seen at the distance of eight digits, or tenths of a foot; which agrees pretty nearly with the observations of others; who make the nearest limit of distinct vision to be eight inches. So that if the glass be a small round globule, whose focal distance is $\frac{1}{20}$ th of an inch, this globule will magnify as 8 to $\frac{1}{20}$ th, or as 160 to 1.

The distance of distinct vision varies in different individuals. Some have stated it at six inches; others at seven; but it has been generally supposed to be eight inches. The medium of seven inches has been adopted by several optical writers. But whatever it be, if this least distance be divided by the focal distance of the glass, the quotient will shew how much the glass magnifies the diameter of the object.

MICROSCOPES, Laws of Single. 1. Simple microscopes magnify the diameter of the object *AB* in the ratio of the distance of the focus *FC* to an interval of eight digits: *v. gr.* if the semi-diameter of a lens, equally convex on both sides, be half a digit, and consequently its focal distance the same; $AB : IK :: \frac{1}{2} : 8 :: 1 : 16$; that is, the diameter of the object will be increased in a sedecuple proportion, or as sixteen to one. 2. Since the distance *FH* is constant, *viz.* eight digits; by how much the distance of the focus *FC* is smaller, so much the smaller ratio will it have to *FH*; consequently the diameter of the object will be so much the more magnified. 3. Since, in plano-convex lenses, the distance of the focus is equal to the diameter; and, in lenses equally convex on both sides, to the semi-diameter: simple microscopes will enlarge the diameter so much the more, as they are segments of smaller spheres. 4. If the diameter of the convexities of a plano-convex lens, and a lens convex on both sides, be the same, *viz.* = 1: the distance of the focus of the first will be 1, of the second $\frac{1}{2}$: consequently, the semi-diameter of the object *AB* will be to the apparent one, in the first case, as 1 to 8; in the latter, as $\frac{1}{2}$ to 8; *i. e.* as 1 to 16. A lens, therefore, convex on both sides, magnifies twice as much as a plano-convex lens.

As the whole depends on the just and steady situation of objects with regard to the lens, various methods have been contrived to that end; whence we have several different kinds of single microscopes. The most simple is as follows:

1. *AB* (*fig. 2.*) is a little tube, to one of whose bases, *BC*, is fitted a plain glass, to which an object, *viz.* a gnat, wing of an insect, down, or the like, is applied; to the other base, *AD*, at a proper distance from the object, is applied a lens convex on both sides, whose semi-diameter is about half an inch; the plain glass is turned to the sun, or the light of a candle, and the object is seen magnified; and, if the tube be made to draw out, lenses of different spheres may be used.

Again, a lens, convex on both sides, is inclosed in a cell *AC* (*fig. 3.*), and by a screw *H* is there fastened: through the pedestal *CD* passes a long screw, by means of which, and the female screw *I*, a style or needle, fixed perpendicular to its extreme, is kept firm at any distance from the lens: in *E* is a little tube, on which, and on the point *G*, the various objects are to be disposed: thus there may be lenses of various spheres applied.

2. But the microscope which is found to answer the end

best, is Mr. Wilson's pocket microscope, which has nine different magnifying glasses, eight of which may be used with two different instruments, for better applying them to various objects. One of these instruments is represented at *AABB* (*fig. 4.*) and is made of ivory, brass, or silver; it has three thin brass plates at *E*, and a spiral spring of steel wire *H* within it; to one of the thin plates of brass is fixed a piece of leather, wood, or ivory *F*, with a small furrow, *G*, both in the leather and brass to which it is fixed: in one end of this instrument there is a long screw *D*, with a convex glass placed in the end of it at *C*: in the other end, *AA*, of the instrument there is a hollow screw, in which any of the magnifying glasses, *M*, are screwed when they are to be made use of. The nine different magnifying glasses are all set in ivory, eight of which are set in the manner expressed at *M*. The greatest magnifier is marked upon the ivory, in which it is set, with $N^{\circ} 1$, the next $N^{\circ} 2$, and so on to $N^{\circ} 8$; the ninth glass is not marked, but is set in the manner of a little barrel box of ivory, as at *b, fig. 5.* *R* is a flat piece of ivory, of which there are eight belonging to this set of microscopes (though any one who has a mind to keep a register of objects may have as many of them as he pleases); in each of them there are four holes *f, f, f*, in which four or more objects are placed between two thin glasses, or talcs, when they are to be used with the greater magnifiers.

The use of this instrument *AABB* is this. Having taken the handle *W* from the instrument in *fig. 5.* and screwed it upon the button *S*, take one of your flat pieces of ivory, *R*, or sliders (if you please to call them so), and slide it betwixt the two thin plates of brass at *E*, through the body of the microscope, so that the object you intend to look upon be ju't in the middle; remarking that you put that side of the plate *R*, where the brass rings are, farthest from the end *AA*; then you are to screw into the hollow screw in the end *AA* of the body of your microscope *M*, the 3d, 4th, 5th, 6th, or 7th magnifying glass; which being done, put the end *AA* close to your eye, and while you are looking through your magnifying glass upon the object, you are to screw in or out the long screw *D*, which moving round upon the leather *F*, held tight to it by the spiral wire *H*, will bring your object to the true distance; which you will know by seeing it clearly and distinctly: but since in the greater magnifiers you can see but a small part of the object, *viz.* the legs or claws of a flea; while you are looking upon any part of the object, if you take hold of the end of the plate or slider *R*, on which the object lies, and move it gently, you may see the whole object successively, or any part of the object you please; and if that part of the object you design to look upon be out of the true distance, remember your end screw, *D*, can always bring it in, by screwing it one way or the other. A simpler and more convenient method of mounting single microscopes is to fix the several magnifying lenses in a flat circular piece of brass, which can be moved round a point as a centre, by the action of an endless screw upon the toothed circumference of the circular plate.

After this manner may be seen all transparent objects, dusts, liquids, crystals of salts, small insects, such as fleas, mites, &c. If they be insects that will creep away, or such objects as one intends to keep, they may be placed between the two register glasses *f, f*. For by taking out (with the point of a pen-knife or small piers) the ring that keeps in the glasses *f, f*, where the object lies, they will fall out of themselves; so that you may lay the object between the two hollow sides of them, and put the ring in as it was before: but if the objects be dusts or liquids, a small drop of the liquid, or

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a little of the dust laid on the outside of the glass *ff*, and applied as before, will be seen very easily.

As to the first, second, and third magnifying glasses, being marked with a + upon the ivory in which they are set, they are only to be used with those plates or sliders that are also marked with a +, in which the objects are placed between two thin tales; because the thickness of the glasses in the other plates or sliders, hinders the object from approaching to the true distance from these greater magnifiers. But the manner of using them is the same with the first: only remember to be careful when you put in or pull out the plate or slider R, on which the object lies, or move it from one object to another, not to let it rub your magnifying glass; which is done by unscrewing a little the end screw D, when you put in or pull out your plate, or move it from one object to another.

For seeing the circulation of the blood at the extremities of the arteries and veins, in the transparent parts of fishes' tails, &c. there are two short glass tubes, the one bigger and the other lesser, in which the fish is to be put; when these tubes are to be used, you are to unscrew the end screw D in the body of the microscope, until the glass tube can be received easily into that little cavity G of the brass plate fastened to the leather F, under the other two thin plates of brass at E. When the tail of your fish lies flat to the glass tube, set it opposite to your magnifying-glass, and by screwing in or out your end screw D, as is said before, you may easily bring it to the true distance, and see the blood circulate with great pleasure.

If you would see the blood circulate in a frog's foot, choose such a frog as will just go into your tube; then with a little slick expand the hinder foot of the frog, and apply it close to the side of the tube, observing that no part of the frog hinders the light from coming on its foot; and when you have it at the just distance, by means of the screw D, as above said, you will see the rapid motion of the blood in its vessels, which are very numerous, in the transparent thin membrane that is between the frog's toes. For this object the fourth and fifth magnifiers will do very well; but you may see the circulation in the tails of water-newts with the sixth and seventh glasses, because the globules of the blood of those newts are as big again as the globules of the blood of frogs or small fish, as has been taken notice of in N^o 280 of the Philosophical Transactions, p. 1184.

The circulation cannot so well be seen by the first, second, and third magnifiers, because the thickness of the glass tube in which the fish lies, hinders the approach of the object to the focus of the magnifying glass.

The other instrument (*fig. 5.*) is made of brass or prince's metal, with joints P, P, P, to turn easily any way, and with a small pair of tongs G G, which open at the points K, by pressing together the two heads of the pins I, I. for taking up of objects. At the other end of these tongs G G, is screwed on a round piece of black wood H, with a piece of ivory let into it, for placing opaque objects on, according to their difference of colour. Upon the end L there is a screw, upon which the glass *b* set in the barrel-box may be screwed. When the other glasses are to be used, there is a ring R of brass to be screwed on the end L, into which ring all the other glasses, M, (*fig. 4.*) may be screwed. So when any object is taken up in the points of the tongs K, or laid upon the other end H, it may very easily (as one who sees the instrument will perceive) be applied to the true focal distance of any of the glasses M, by the help of the joints P, P, P, and by means of the screw C, with the nut D, which being regulated by a spring N, will bring the object to the exact distance for distinct vision.

The glass placed in the manner of a barrel-box at *b*, is only to be used with the brass instrument (or in your hand) being the least magnifier for greater objects, such as fleas and common insects, &c. remembering to put the hole at *b* next to your eye.

In the viewing of objects, one ought to be careful not to hinder the light from falling on them, by the hat, peruke, or any other thing, especially in looking at opaque objects; for nothing can be seen with the best of glasses, unless the object be at a due distance, with a sufficient light. The best lights for the plates or sliders, where the object lies between the two glasses, is a clear sky-light, or where the sun shines on any white thing, or the reflexion of the light from a looking-glass. The light of a candle is likewise good for the viewing of very small objects, though it be a little uneasy to those who are not practised in microscopes to find it out. The only use of the convex lens at C (*fig. 4.*) is to collect the light into a narrower compass where it falls upon the object, after it has passed through a moderate hole in the leather F.

For the convenience of those who would draw, or make any sketches or designs of microscopical objects, they may also have a pedestal to fix the two instruments above described, and make them stationary to any convenient light. This pedestal may be placed on a table, and after the object and light are fixed, as many persons as please may view the object without any trouble or difficulty in finding the light. (Phil. Trans. abr. vol. iv. p. 199, &c.) Mr. Baker in his treatise "Of Microscopes," (vol. i.) has described an invention for fixing the pocket microscope of Wilson, and giving light to it by a speculum. For this purpose a scroll of brass is fixed upright and steady on a round pedestal of wood. A brass screw is made to pass through a hole in the upper limb of the scroll into the side of the microscope, so as to screw it fast to the scroll. On the pedestal is fixed an arch, in which a concave speculum, set in a box of brass, is suspended by means of two small screws, that fasten to its opposite sides. As the arch turns on the pin by which it is fixed to the pedestal, and the speculum turns within the arch, it may, by this twofold motion, be easily adjusted in such a manner as to reflect the light of the sky, the sun, or a candle, directly upwards, through the microscope that is fixed perpendicularly over it; and by so doing, may answer almost all the purposes of the large double reflecting microscope. The body of the microscope may also be fixed horizontally, and objects may be viewed from that position, by any light you choose; which is an advantage that does not belong to the reflecting microscope. It may be also rendered further useful, by means of a slip of glass, one end of which being thrust between the plates where the sliders go, and the other extending to some distance, such objects may be placed upon it as cannot be applied on the sliders; and then, having a limb of brass that may fasten to the body of the microscope, and extend over the projecting glass a hollow ring on which to screw the magnifiers, all sorts of subjects may be examined with great convenience, if a hole be made in the pedestal to place the speculum exactly underneath, and thereby throw up the rays of light. What has been said hitherto, is to be understood of *lenticular* microscopes; as for *spherical* ones, their doctrine will be understood from what follows.

If an object A B (*fig. 6.*) be placed in the focus of a glass spherule F, and the eye be behind it, *v. gr.* in the focus G; the object will be seen distinct, in an erect situation, and magnified, as to its diameter, in a ratio of $\frac{3}{4}$ ths of the diameter E I, to the distance at which objects are to be placed to be seen distinctly with the naked eye.

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The first part of the proposition is proved in the same manner of spheres, as of lenses. As, then, a good eye sees an object distinctly at the distance of eight digits, a glass spherule will enlarge the diameter of an object in a ratio of $\frac{3}{4}$ ths of the diameter to eight digits. Suppose, then, the diameter of the spherule E $\frac{1}{100}$ th of a digit, CE will be $= \frac{1}{20}$, and $FE = \frac{1}{40}$; and therefore $FC = \frac{1}{20} + \frac{1}{40} = \frac{3}{40}$. Consequently, the true diameter of an object to its apparent one is in the ratio of $\frac{3}{40}$ to 8; *i. e.* as 3 to 320, or as 1 to 106 nearly.

Now a lens, convex on both sides, increases the diameter in a ratio of the femidiameter to the space of eight digits; wherefore $\frac{1}{2}$ having a less ratio to eight than $\frac{3}{4}$ ths, if a lens and a sphere have the same diameter, the former will magnify more than the latter; and, pretty much after the same manner, it may be shewn, that a sphere, of a less diameter, magnifies more than another of a large one.

As for the methods of casting little glass spherules for microscopes, they are various. The first person who improved single microscopes by using small globules of glass, made by melting them in the flame of a candle, was Hartsoeker, who thus discovered the animalcula in femine masculino, and laid the foundation of a new system of generation. Wolfius describes the following method of making globules of this kind; a small piece of very fine glass, sticking to the wet point of a steel needle, is to be applied to the extreme blueish part of the flame of a lamp, or, which is better, to the flame of spirit of wine, to prevent its being blackened: being there melted and run into a little round drop, it is to be removed from the flame, upon which it instantly ceases to be fluid; folding, then, a thin plate of brass, and making very small smooth perforations, so as not to leave any roughness on the surfaces; and, farther, smooth them over, to prevent any glaring, fit the spherule between the plates against the apertures, and put the whole in a frame, with objects convenient for observation.

Mr. Adams gives another method, thus: take a piece of fine window-glass, and raise it, with a diamond, into as many lengths as you think needful, not exceeding an eighth of an inch in breadth; then holding one of those lengths between the fore-finger and the thumb of each hand, over a very fine flame, till the glass begins to soften, draw it out till it be as fine as a hair, and break; then, applying each of the ends into the purest part of the flame, you have two spheres presently, which you may make larger, or less, at pleasure: if they stay long in the flame, they will have spots; so they must be drawn out immediately after they are turned round. As to the stem, break it off as near the ball as possible; and, lodging the remainder of the stem between the plates, by drilling the hole exactly round, all the protuberances are buried between the plates; and the microscope performs to admiration.

Mr. Butterfield, in the *Phil. Transf.* N^o 141, recommends, for making glass globules clear and without specks, the flame of a lamp, made with rectified spirit of wine, and instead of a cotton wick, fine silver-wire, doubled like a skain of thread; then having beaten some fine glass to powder, and washed it clean, he directs to take a little of it upon the sharp point of a silver needle, wetted with spittle, and to hold it in the flame, turning it about till it melts, and becomes quite round. When many globules are thus formed, he rubs them with soft leather; and having several small pieces of thin brass plates, twice as long as they are broad, he doubles them up into the form of a square, and pushes a fine hole through the middle of them, and having rubbed off the bur about the holes with a whetstone, and blackened the inside of the plates with the smoke of a candle, he places

a globule between the two holes, and tacks the plates together with two or three rivets.

Dr. Hooke used to take a very clear piece of glass, and to draw it out into long threads in a lamp; then he held these threads in the flame, till they ran into round globules hanging to the end of the threads. Then having fixed the globules with sealing-wax to the end of a stick, so that the threads stood upwards, he ground off the ends of the threads upon a whetstone, and polished them upon a smooth metal plate with a little putty. Mr. Stephen Gray tells us, (*Phil. Transf.* N^o 221. 223.) that for want of a spirit lamp, he laid a small particle of glass, about the size of the intended globule, upon the end of a piece of charcoal; and by means of a blast-pipe, with the flame of a candle, he soon melted it into a globule. He thus made them indifferently clear, and the smallest very round; but the larger by resting upon the coal were a little flattened, and became rough on that side. He therefore ground and polished them upon a brass plate, till he reduced them to hemispheres. But he found that the small round globules not only magnified more, but shewed objects more distinct than the hemispheres.

By these methods may spheres be made much smaller than any lens; so that the best single microscopes, or those which magnify the most, are made of them. For suppose the diameter of a spherule to be $\frac{1}{10}$ of a digit, the distance of its focus will be $\frac{1}{4}$; and therefore its real diameter to its apparent one, as $\frac{1}{10}$ to $\frac{1}{4}$; that is, as $\frac{3}{10}$ to 8, or as 3 to 512; or, lastly, as 1 to 170. The surface of an object, therefore, will be increased by it in the proportion of 1 to 28900, and its bulk in a ratio of 1 to 4913000.

Mr. Leeuwenhök and M. Muschenbroek have succeeded very well in spherical microscopes; and the apparatus of the latter is much commended; but we forbear any descriptions of them; it being easy for any one who considers the structure of those consisting of lenses, to conceive how those of spheres may be contrived.

Mr. Leeuwenhök's microscopes were all single ones; each of them consisting of a small double convex glass set in a socket, between two silver plates, riveted together, and pierced with a small hole; and the object was placed on the point of a needle, so contrived, as to be placed at any distance from the lens. If the objects were solid, he fastened them with glue; and if they were fluid, or, on other accounts, required to be spread on glass, he placed them on a small piece of Muscovy talc, or glass blown very thin, which he afterwards glued to his needle. He had however a different apparatus for viewing the circulation of the blood, which he could fix to the same microscopes. Those which he bequeathed to the Royal Society were contained in a small Indian cabinet, in the drawers of which were thirteen little boxes or cases, in each of which were two microscopes, neatly fitted up in silver; and both the glass and the apparatus were made with his own hands. The greatest magnifier among these enlarged the diameter of an object about 160 times. *Phil. Transf. Abr.* vol. vi. p. 129, &c. *Id.* vol. viii. p. 121, &c.

Several writers, says Mr. Baker (*ubi infra*) have represented the glasses used by Mr. Leeuwenhök in his microscopes, to be little globules or spheres of glass; but he assures us, from an inspection of his cabinet, that every one of the 26 microscopes contained in it, was a double convex lens, and not a sphere or globule.

The smallest globules, and consequently the greatest magnifiers for microscopes that have yet been executed, were made by F. Di Torre of Naples, who, in 1765, sent four of them to the Royal Society. The largest of them was only

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only two Paris points in diameter, and is said to magnify the diameter of an object 640 times; the second was the size of one Paris point; magnifying the diameter 1280 times, and the third no more than one-half of a Paris point, or the 144th part of an inch in diameter, and was said to magnify the diameter of an object 256 times, and consequently the square of such a diameter 6553,600 times. But since the focus of a glass globule is at the distance of one-fourth of its diameter, and, therefore, that of the third globule of Di Torre, above mentioned, only the 576th part of an inch distant from the object, it must be with the utmost difficulty that globules so minute as these can be employed to any purpose; and Mr. Baker, to whose examination they were referred, considers them as matters of curiosity rather than of real use. (Phil. Trans. vol. lv. p. 246. vol. lvi. p. 67, &c.) For an account of observations made with these globules on the blood, see BLOOD.

Experience, says Mr. Baker, in his treatise "Of Microscopes," has taught us, that those globules which were at first highly extolled and much sought after, admit so little light, can shew only such an exceeding minute part of any object, are so difficult to be used, and strain the eyes so much, that their power of magnifying, for want of due distinctness, is rather apt to produce error than to discover truth, and therefore now they are very rarely employed.

In order to state clearly and distinctly the method of determining the magnifying powers of glasses employed in single microscopes, we shall observe, that if the focus of a convex lens (*e. g.*) be at one inch, and the natural sight at eight inches, which is the common standard, an object may be seen through that lens at one inch distant from the eye; and will appear, in its diameter, eight times larger than to the naked eye. But as the object is magnified every way equally, in length as well as breadth, we must square this diameter, to know really how much it appears enlarged; and we shall then find, that its superficies is indeed magnified sixty-four times.

Again: suppose a convex lens whose focus is at one-tenth of an inch distant from its centre: in eight inches there are eighty such tenths of an inch; and therefore an object may be seen through this lens eighty times nearer than it can distinctly be by the naked eye. It will consequently appear eighty times longer, and eighty times broader, than it does to common sight; and a eighty multiplied by eighty makes six thousand and four hundred, to many times it really appears magnified.

To go one step farther: if a convex glass be so small, that its focus is no more than one-twentieth of an inch distant; we shall find that eight inches, the common distance of sight, contain an hundred and sixty of these twentieth parts; and, in consequence, the length and breadth of an object, when seen through such lens, will each be magnified an hundred and sixty times; which multiplied by an hundred and sixty, to give the square, will amount to twenty-five thousand six hundred; and so many times, it is plain, the superficies of the object must appear larger than it does to the naked eye at the distance of eight inches.

Therefore, in a single microscope, to learn the magnifying power of any glass, no more is necessary than to bring it to its true focus; the exact place of which will be known, by an object's appearing perfectly distinct and sharp when placed there. Then, with a pair of small compasses, measure, as nearly as you can, the distance from the centre of the glass to the object you were viewing, and afterwards applying the compasses to any ruler with a diagonal scale of the parts of an inch marked on it, you will easily find how many parts of an inch the said distance is. When that is known, compute how many times those parts of an inch are contained in eight inches, the common standard of sight, and that will give you the number of times the diameter is magnified: squaring the diameter will give you the superficies; and if it be an object whose depth or whole contents you would learn, multiplying the superficies by the diameter will shew the cube or bulk.

A TABLE of the Magnifying Powers of Convex Glasses, employed in Single Microscopes, according to the Distance of their Focus: Calculated by the Scale of an Inch divided into an Hundred Parts: Shewing how many Times the Diameter, the Superficies, and the Cube of an Object is magnified, when viewed through such Glasses, to an Eye whose natural Sight is at Eight Inches, or Eight Hundred of the Hundredth Parts of an Inch.

		Magnifies the Diameter.	Magnifies the Superficies.	Magnifies the Cube of an Object.		
The focus of a glass at	} Hundred parts of an inch: }	$\frac{1}{2}$ or 50	16	256	4,096	} Times.
		$\frac{1}{3}$ or 40	20	400	8,000	
		$\frac{1}{4}$ or 30	26	676	17,576	
		$\frac{1}{5}$ or 20	40	1,600	64,000	
		15	53	2,806	148,877	
		14	57	3,249	185,193	
		13	61	3,721	226,981	
		12	66	4,356	287,496	
		11	72	5,184	373,248	
		$\frac{1}{10}$ or 10	80	6,400	512,000	
		9	88	7,744	681,472	
		8	100	10,000	1,000,000	
		7	114	12,996	1,481,544	
		6	133	17,689	2,352,637	
		$\frac{1}{5}$ or 5	160	25,600	4,096,000	
		4	200	40,000	8,000,000	
		3	266	70,756	18,821,096	
		$\frac{1}{3}$ or 2	400	160,000	64,000,000	
1	800	640,000	512,000,000			

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N.B. The greatest magnifier in Mr. Leeuwenhoek's Cabinet of Microscopes, presented to the Royal Society, has its focus, as nearly as can well be measured, at $\frac{1}{2}$ th of an inch distance from its centre, and consequently magnifies the diameter of an object 160 times, and the superficies 25,600. But the greatest magnifier in Mr. Wilson's single microscopes, as they are now made, has usually its focus at no farther distance than about the fiftieth part of an inch; whereby it has the power of enlarging the diameter of an object 400, and its superficies 160,000 times.

The following Table is calculated on the supposition that the nearest distance at which we can see distinctly is seven inches; and shews the magnifying power of small convex lenses or single microscopes, not exceeding an inch in focal length.

Focal Distance of the Lens or Microscope.	Number of Times that the Diameter of an Object is magnified.	Number of Times that the Surface of an Object is magnified.	Number of Times that the Cube of an Object is magnified.	
100ths of an Inch.	Times. Dec. of a Time.	Times.	Times.	
I	100	7.00	49	343
$\frac{3}{4}$	75	9.33	87	810
$\frac{2}{3}$	50	14.00	196	2744
$\frac{2}{5}$	40	17.50	306	5360
$\frac{1}{3}$	30	23.33	544	12698
$\frac{1}{2}$	20	35.00	1225	42875
	19	36.84	1354	49836
	18	38.89	1513	58864
	17	41.18	1697	69935
	16	43.75	1910	83453
	15	46.66	2181	101848
	14	50.00	2500	125000
	13	53.85	2894	155721
	12	58.33	3399	198156
	11	63.67	4045	257259
$\frac{1}{10}$	10	70.00	4900	343000
	9	77.78	6053	470911
	8	87.50	7656	669922
	7	100.00	10000	1000000
	6	116.66	13689	1601613
$\frac{1}{5}$	5	140.00	19600	2744000
$\frac{1}{3}$	4	175.00	30625	5359375
	3	233.33	54289	12649337
$\frac{1}{2}$	2	350.00	122500	42875000
	1	700.00	490000	343000000

Ferguson's Mechanics by Brewster, vol. ii. p 449.

MICROSCOPE, Water. Mr. S. Gray, and, after him, Wolfius, and others, have contrived water microscopes, consisting of spherules, or lenses of water, instead of glass, fitted up somewhat after the manner of those above mentioned (as spheres of water may be likewise used instead of glass in any of the common microscopes.) But since the distance of the focus of a lens or sphere of water is greater than that of one of glass (the spheres whereof they are segments being the same), water microscopes magnify less, and are therefore less esteemed than those of glass. The same Mr. Gray first observed, that a small drop or hemispherule of water, held to the eye by candlelight or moonlight, without any other apparatus, magnified the animalcula contained in it vastly more than any other microscope. The reason is, that the rays, coming from the interior surface of the first hemi-

sphere, are reflected so as to fall under the same angle on the surface of the hind hemisphere, to which the eye is applied, as if they came from the focus of the spherule; whence they are propagated to the eye in the same manner as if the objects were placed without the spherule in its focus. Phil. Trans. N^o 221. 223. Smith's Optics, vol. ii. p. 334. &c.

Hollow glass spheres, of the diameter of about half a digit, filled with spirit of wine, are frequently used for microscopes: but they do not magnify near so much.

Dr. Brewster, in the Appendix to his edition of Ferguson's Mechanics, &c., describes a microscope totally different from that of Mr. Gray, though founded upon the same general principle. Instead of water, he makes use of very pure and viscid turpentine, which he takes up by the point of a piece of wood, and drops successively upon a thin and well polished glass: different quantities being thus taken up and dropped in a similar manner form four or more plano-convex lenses of turpentine varnish, which may be made of any focal length, by taking up a greater or less quantity of the fluid. The lower surface of the glass having been first smoked with a candle, the black pigment below the lenses is then to be removed, so that no light may pass by their circumference. The piece of glass is then to be perforated, and surrounded with a toothed wheel, which can be moved round the hole as a centre by an endless screw. The apparatus is then placed in a circular case, and this case fixed to an horizontal arm by means of a brass pin, which passes through its upper and under surfaces, and through the hole already mentioned, which does not embrace the pin very tightly, in order that the toothed wheel may revolve with facility. On the upper surface of the circular case is an aperture directly above the line described by the centres of the fluid lenses, when moving round the central hole; and in this aperture is inserted a small cap, with a little hole at its top, to which the eye is applied. A moveable stage carries the slider, on which microscopic objects are laid, and is brought nearer or removed from the lenses by a vertical screw. The objects on the slider are illuminated by a plain mirror, which has both a vertical and horizontal motion for this purpose. When the microscope is thus constructed, the object to be viewed is placed upon the slider, and the endless screw is turned till one of the lenses be directly under the aperture; and the slider is thus raised or depressed by the vertical screw, till the object be brought into the focus of the lens. In this manner, by turning the endless screw, and bringing all the lenses, one after another, directly below the aperture, the object may be successively examined with a variety of magnifying powers. These fluid lenses have been employed as the object-glasses of compound microscopes.

The *single aquatic microscope* of Mr. Ellis has the advantage of being simple in its construction, portable, and very commodious for the purposes of practical botanists, the observers of animalcula, &c. K (fig. 7.) represents the box containing the whole apparatus: it is generally made of fish-skin; and on the top there is a female screw, for receiving the screw that is at the bottom of the pillar A: this is a pillar of brass, and is screwed on the top of the box. D is a brass pin which fits into the pillar; on the top of this pin is a hollow socket to receive the arm which carries the magnifiers; the pin is to be moved up and down, in order to adjust the lenses to their focal or proper distance from the object. [N. B. In the representations of this microscope, the pin D is delineated as passing through a socket at one side of the pillar A; whereas it is usual at present to make it pass down a hole bored through the middle of the pillar.] E, the bar which carries the magnifying lens; it fits into the socket

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socket X, which is at the top of the pin or pillar D. This arm may be moved backwards and forwards in the socket X, and sideways by the pin D; so that the magnifier, which is screwed into the ring at the end E of this bar, may be easily made to traverse over any part of the object that lies on the stage or plate B. F F is a polished silver speculum, with a magnifying lens placed at the centre thereof, which is perforated for this purpose. The silver speculum screws into the arm E, as at F. G, another speculum, with its lens, which is of a different magnifying power from the former. H, the semicircle which supports the mirror I; the pin R, affixed to the semicircle H, passes through the hole which is towards the bottom of the pillar A. B, the stage, or the plane, on which the objects are to be placed; it fits into the small dove-tailed arm which is at the upper end of the pillar D A. A plane dove-tail glass, with a small piece of black silk stuck on it, is used to lie in a circular groove made in the stage B. A hollow watch glass is to be laid occasionally on the stage instead of the plane glass. L, a pair of nippers. These are fixed to the stage by the pin at bottom; the steel wire of these nippers slides backwards and forwards in the socket, and this socket is moveable upwards and downwards by means of the joint, so that the position of the object may be varied at pleasure. The object may be fixed in the nippers, stuck on the point, or affixed, by a little gum-water, &c. to the ivory cylinder N, which occasionally screws to the point of the nippers.

To use this microscope: take all the parts of the apparatus out of the box; then begin by screwing the pillar A to the cover of it; pass the pin R of the semicircle which carries the mirror through the hole that is near the bottom of the pillar A; push the stage into the dove-tail at B, slide the pin into the pillar (see the N.B. above); then pass the bar E through the socket which is at the top of the pin D, and screw one of the magnifying lenses into the ring at F. The microscope is now ready for use: and though the enumeration of the articles may lead the reader to imagine the instrument to be of a complex nature, we can safely affirm that he will find it otherwise. The instrument has this peculiar advantage, that it is difficult to put any of the pieces in a place which is appropriated to another. Let the object be now placed either on the glasses of the stage, or in the nippers L, and in such manner that it may be as nearly as possible over the centre of the stage: bring the speculum F over the part you mean to observe; then throw as much light on the speculum as you can, by means of the mirror I, and the double motion of which it is capable; the light received on the speculum is reflected by it on the object. The distance of the lens F from the object is regulated by moving the pin D up and down, until a distinct view of it is obtained. The best rule is, to place the lens beyond its focal distance from the object, and then gradually to slide it down till the object appears sharp and well defined. The adjustment of the lenses to their focus, and the distribution of the light on the object, are what require the greatest attention: on the first the distinctness of the vision depends; the pleasure arising from a clear view of the parts under observation is due to the modification of the light. No precise rule can be given for attaining accurately these points; it is from practice alone that ready habits of obtaining these necessary properties can be acquired, and with the assistance of this no difficulty will be found.

Mr. B. Martin has also contrived a microscope for similar purposes with those to which that of Mr. Ellis is adapted. A B (fig. 8.) represents a small arm supporting two or more magnifiers, one fixed to the upper part as at B, the other to the lower part of the arm at C; these may be used

separately or combined together. The arm A B is supported by the square pillar I K, the lower end of which fits into the socket E of the foot F G; the stage D L is made to slide up and down the square pillar; H, a concave mirror for reflecting light on the object.—To use this microscope, place the object on the stage, reflect the light on it from the concave mirror, and regulate it to the focus, by moving the stage nearer to or farther from the lens at B. The ivory sliders pass through the stage; other objects may be fixed in the nippers M, N, and then brought under the eye-glasses; or they may be laid on one of the glasses which fit the stage. The apparatus to this instrument consists of three ivory sliders; a pair of nippers; a pair of forceps; a flat glass and a concave ditto, both fitted to the stage.

The two last microscopes are frequently fitted up with a toothed rack and pinion, for the more ready adjustment of the glasses to their proper focus.

Dr. Withering, in his "Botanical Arrangements," describes a portable botanic microscope. It consists of three brass plates, A, B, C. (fig. 9.) which are parallel to each other; the wires D and E are rivetted into the upper and lower plates, which are by this means united to each other; the middle plate or stage is moveable on the aforesaid wires by two little sockets which are fixed to it. The two upper plates each contain a magnifying lens, but of different powers; one of these confines and keeps in their places the fine point F, the forceps G, and the small knife H.—To use this instrument, unscrew the upper lens, and take out the point, the knife, and the forceps; then screw the lens on again, place the object on the stage, and then move it up or down till you have gained a distinct view of the object, as one lens is made of a shorter focus than the other; and spare lenses of a still deeper focus may be had if required. This little microscope is the most portable of any. Its principal merit is its simplicity.

Mr. B. Martin has contrived to mount several lenses in one frame, which are convenient for various purposes, and are carried in the pocket. He calls this apparatus a "Hand Megaloscope," from its use in viewing the larger sort of small objects expeditiously. The case with its three frames and lenses, is represented in fig. 10. The lenses are commonly of 1, 1½ and 2 inches focus; they are contrived so as to turn over each other, and that into the case. The three lenses singly afford three magnifying powers; and by combining two and two, we obtain three more; *d* with *c* making one, *d* with *f* another, and *c* with *f* a third; and all three combined together make another; so that by this simple apparatus we have seven different magnifying powers. When the three lenses are combined, it is better to turn them in, and look through them by the small apertures in the sides of the case. The eye in this case is not incommoded by external light; the aberration of the superfluous rays through the glasses is precluded; and the eye coincides more exactly with the common axes of the lenses.

M. Lyonet has invented a curious and useful microscope, for the purpose of minute dissections and microscopic preparations. A B (fig. 11.) is the anatomical table, which is supported by a pillar N O; this is screwed on the foot CD. The table A B is prevented from turning round by means of two steady pins. In this table or board there is a hole G, which is exactly over the centre of the mirror E F, that is to reflect the light on the object; the hole G is designed to receive a flat or concave glass, on which the objects for examination are to be placed.

R X Z is an arm formed of several balls and sockets, by which means it may be moved in every possible situation; it is fixed to the board by means of the screw H. The last

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arm I Z has a female screw, into which a magnifier may be screwed as at Z. By means of the screw H, a small motion may be occasionally given to the arm I Z, for adjusting the lens with accuracy to its focal distance from the object.

Another chain of balls is sometimes used, carrying a lens to throw light upon the object; the mirror is likewise so mounted, as to be taken from its place at K, and fitted on a clamp, by which it may be fixed to any part of the table A B.

To use the Dissecting Table.—Let the operator sit with his left side near a light window; the instrument being placed on a firm table, the side D H towards the stomach, the observations should be made with the left eye. In dissecting, the two elbows are to be supported by the table on which the instrument rests, the hands resting against the board A B; and in order to give it greater stability (as a small shake, though imperceptible to the naked eye, is very visible in the microscope), the dissecting instruments are to be held one in each hand, between the thumb and two fore-fingers.

MICROSCOPES, Theory of Compound, or Double. Suppose an object-glass E D, (*Plate XII. Optics, fig. 1.*) the segment of a very small sphere, and the object A B placed without the focus F.

Suppose an eye-glass G H, convex on both sides, and the segment of a sphere greater (though not too great) than that of D E; and let it be so disposed behind the object, as that if C F : C L :: C L : C K; the focus of the eye-glass may be in K.

Lastly, suppose L K : L M :: L M : L I.

If, then, O be the place in which an object is seen distinct with the naked eye; the eye, in this case, being placed in I, will see the object A B distinctly, in an inverted situation, and magnified in a compound ratio of M K to L K, and L C to C O; as is proved from the laws of dioptrics; *i. e.* the image itself is larger than the object, and we are able to view it distinctly at a less distance. *E. G.* If the image be twenty times larger than the object, and by the help of the eye-glass we are able to view it five times nearer than we could have done with the naked eye, it will, on both these accounts, be magnified 5 times 20, or 100 times.

MICROSCOPES, Laws of Double 1. The more an object is magnified by the microscope, the less is its *field*, *i. e.* the less of it is taken in at one view.

2. To the same eye-glass may be successively applied object-glasses of various spheres, so as that both the entire objects, but less magnified, and their several parts, much more magnified, may be viewed through the same microscope. In which case, on account of the different distances of the image, the tube L K, in which the lenses are fitted, should be made to draw out. For the proportion of the object-glass to the eye-glass, some commend the subduple ratio, and some the subsextile. De Chales will have the semidiameter of the convexity of the object-glass to be $\frac{1}{3}$ of a digit, or, at most, $\frac{1}{2}$; in the eye-glass an entire digit, or even $1\frac{1}{2}$. Chrubin makes the semidiameter of the object-glass $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ of a digit; the semidiameter of the eye-glass $1\frac{1}{3}$, or $1\frac{1}{2}$ of a digit.

3. Since it is proved that the distance of the image L K from the object-glass D E will be greater, if another lens, concave on both sides, be placed before its focus; it follows, that the object will be magnified the more, if such a lens be here placed between the object-glass D E, and the eye-glass G H. Such a microscope is much commended by Conradi, who used an object-lens, convex on both sides, whose semidiameter was two digits, its aperture equal to a mustard-feed; a lens, concave on both sides, 12, or at most

16 digits; and an eye-glass, convex on both sides, of six digits.

4. Since the image is projected to the greater distance, the nearer another lens, of a segment of a larger sphere, is brought to the object-glass; a microscope may be composed of three lenses which will magnify prodigiously.

5. From these considerations it follows, that the object will be magnified the more, as the eye-glass is the segment of a smaller sphere; but the field of vision will be the greater, as the same is a segment of a larger sphere. If, then, two eye-glasses, the one a segment of a larger, the other of a smaller sphere, be so combined, as that the object appearing very near through them, *i. e.* not farther distant than the focus of the first, be yet distinct; the object, at the same time, will be exceedingly magnified, and the field of vision much greater than if only one lens was used; and the object will be still more magnified, and the field enlarged, if both the object and eye-glass be double. But in regard an object appears dim, when viewed through so many glasses, part of the rays being reflected in passing through each, the multiplying of lenses is not advisable; and the best, among compound microscopes, are those which consist of one object-glass and two eye-glasses. These eye-glasses are placed sometimes close together, and sometimes an inch asunder; by which means, although the object appears less magnified, yet the visible area is much enlarged by the interposition of a second eye-glass, and thus a much pleasanter view is obtained. This additional lens is called the amplifying glass, and is generally about $1\frac{1}{2}$ inch in diameter, and $2\frac{1}{2}$ inches in focal length.

Dr. Hooke tells us, in the preface to his Micrography, that in most of his observations he used a microscope of this kind, with a middle eye-glass of a considerable diameter, when he wanted to see much of the object at one view, and took it out when he would examine the small parts of an object more accurately; for the fewer refractions there are, the more light and clear the object appears.

For a microscope of three lenses, De Chales commends an object glass of $\frac{1}{3}$ or $\frac{1}{4}$ of a digit; and the first eye-glass he makes 2 or $2\frac{1}{2}$ digits; the distance between the object-glass and eye-glass about twenty lines. Conradi had an excellent microscope, the object-glass of which was half a digit, and the two eye-glasses (which were placed very near) four digits; but it answered best, when, in lieu of the object-glass, he used two glasses, convex on both sides, their sphere about a digit and a half, or at most two, and their convexities touching each other within the space of half a line. Eustachius de Divinis, instead of an object-glass convex on both sides, used two plano-convex lenses, whose convexities touched; Grindelius did the same, only that the convexities did not quite touch. Zahnus made a binocular microscope, in which both eyes were used.

It is observed that compound microscopes sometimes exhibit a fallacious appearance, by representing convex objects concave, and *vice versa*. See Phil. Trans. N 476. p. 387.

The magnifying power of a microscope with more than two lenses, must be computed from the effect of all the lenses (see LENS); or it may be ascertained experimentally in the following manner. Place part of a divided ruler before the microscope, so that, looking through the instrument, you may see one of its divisions magnified; then open the other eye also, and looking with it at the ruler out of the microscope, you will perceive the image of the magnified division as it were projected upon the ruler; and you may easily see how many divisions of the unmagnified ruler measure, or are equal to, the single magnified division, and that number is the magnifying power of that microscope. Thus, if the

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ruler be divided after the common way into inches and tenths, and if you find that one magnified tenth is equal to three inches, you may conclude that the microscope magnifies 30 times.

MICROSCOPE. Structure or Mechanism of a Double. The industry and address of our countryman, Mr. Marshall, here deserve to be remembered; the construction of the original double microscope being of his contrivance. In this the eye-glass is at *W* (*Plat. XIII. fig. 1.*) the object-glass at *C*, the middle glass at *A* 1: *B* is the cover or lid, to keep out the dust from the eye-glass *W*; *X* is the place of the eye, *W* a screw where the eye-glass lies; *A* 1 a screw where the middle glass lies; *A* 2 the drawer, where the outermost tube *A* 1 *A* 2 is disjoined from the inner one, of the same length; *Z* the frame or basis on which the microscope stands firm; *T* a small drawer in the frame or basis, with a ledge or till in it, having six partitions to hold so many several object-glasses, one magnifying more than another, and fixed in brass cells ready to screw on at *C*, and marked 1, 2, 3, 4, 5, 6; these partitions are also marked 1, 2, 3, 4, 5, 6; the other part of the drawer serves to hold the object-plate; a pair of small nippers, to take up, or handle any object conveniently; another object-plate, having one side white and the other black, to fix your objects upon, as black upon white, and white objects on black. *L M* is a brass ball and socket, on which the whole body of the microscope is moveable, so as to lie in any position for the light. *L K*, a square brass pillar, on which the microscope is moveable up and down, by means of the collar *E*, into which the axis *D* (holding the microscope) is continued. *G*, another brass collar sliding up and down on the pillar *L K*, having a small screw *H*, by which it is, as occasion serves, fixed fast to the said pillar, at any height. *I*, a large brass nut, in whose centre is a female screw, fitted to the male screw *F*, which is fixed in the collar *E*; by the turning of which nut *I* (the collar *G* being first fixed to the pillar by the screw *H*) the microscope is raised up or down on the pillar, and made to come nearer or go farther from the object *P c*; and, which is also a very great advantage, the axis of the microscope is always kept perpendicular to that point of the object, over which it was first placed; so that here is not the inconvenience which occurs in other glasses of often losing the sight of the object, by screwing the glass *C* higher or lower. *P Q* is a glass object-plate fixed in a brass frame, whose arm *NN* is fixed to the pillar by means of the nut *O*. The arm *NN* hath in it a slit, by which it is easily put on, or taken off the pillar, and by which it may be fixed upon it at any distance. *P*, a small fish lying on the glass-plate, that the circulation of the blood may be seen in the end of the tail-fin. *R*, a convex glass, by whose help a bright spot of light is brought from a candle at *S*, standing on the ground, while the microscope stands on the edge of a table or stool, which spot of light, *c*, serves to render the circulation more conspicuous. *V*, a leaden coffin to be put on the fish, to hinder it from springing away, and moving his tail out of the light. 1, 2, 3, 4, 5, 6, are marked on the pillar *L K*, to shew the respective distances of the object-glasses from the object you look upon according as the object-glasses you make use of magnify more or less. Thus, for instance, if you use the object-glass 5 or 6 (either of which will shew the circulation of the blood) you must fix the upper edge of the collar *E*, at the mark 5 or 6 on the pillar. And then the microscope will be very near its exact distance from the object; so that by a small turn or two of the nut *I* one way or the other, to be found by trial, you may soon fit it exactly to your own eye.

By this microscope liquors also may be very commodiously examined; for if you place a small drop of any liquor on the

glass-plate, just in the middle of the spot of light *c*, the parts of it will become very visible, and its animalcula, if it have any, will be discovered. And thus may the cells in vinegar, the small creatures in black-pepper water, or in water where wheat, barley, &c. has been infused, the cells and other small living creatures in puddle-water, be as plainly seen as by almost any other microscope.

In the microscope, in which the objects are illuminated by reflection, made by Mr. Culpeper and Mr. Scarlet, as an improvement of Mr. Marshall's, the inner tube, *ab*, (*fig. 2.*) which slides in the outer, *cd*, holds all the glasses. The eye-glass is at *aa*, the broad middle glass at *bb*, and the object-glass, being set in a button at *c*, is screwed upon the end of a narrower tube *fg*; which being fixed in the base of the inner tube, passes freely through a hole in the base of the outer. The buttons that contain several object-glasses are marked 1, 2, 3, &c. and the convexity of the inner tube is also marked with dotted circles, numbered 1, 2, 3, &c. in order to bring that circle to coincide with the mouth *cc* of the outer tube, whose number is the same as that of the object-glass then made use of. But if the object does not yet appear quite distinct, the pinion *R* must be turned, which, by a rack on the tube of the microscope, brings it nearer to the object placed below it. Of these glasses the greater magnifiers are known by their having smaller apertures.

The base *dd* of the outer tube is supported by three brass pillars, fixed into a wooden pedestal *b*; and a little below the object-glass *f*, a circular plate *ik* is fixed like a stage between the pillars, having a circular hole in the centre to receive glasses, &c. to place objects upon. Three small brass circles *mn*, with holes through the middle of them, are to be placed over the hole in the middle of the stage; and then the ivory sliders with objects may be put between the two uppermost of these circles, which are pressed together by a spiral spring wire lodged between the two undermost; the two outermost being held together by two small pillars passing through two holes in the circumference of the middle circle. For viewing the circulation of the blood, the button *p*, on the under side of the frame of a broad plane glass *qr*, being put through a slit made in the stage, a small brass bolt *s*, under the stage, must be shoved inwards, till a smaller slit in it embraces the neck of the said button; and then the fish being laid upon this glass, and covered with the leaden coffin *V*, (*fig. 1.*) its tail may be brought exactly under the object-glass by turning the glass *p q* about the button, or by shoving it inwards or outwards along the slit in the stage. The circular object-plate *v x* has a like button in its centre, to be put into the same slit as before; and then the different objects, placed between two talcs in the holes made round the circumference of the plate, may be viewed successively by turning the plate about its centre.

All these transparent objects are illuminated extremely well in this microscope, either by candle-light or sky-light reflected upwards from a concave looking-glass *y z*, placed in a frame from the centre *b* of the pedestal. While you are viewing the object through the microscope, turn this concave upon its horizontal poles *y z*, and you will soon find out that position of it in which it reflects the most light through the hole in the stage upon the object; and this happens when it reflects the rays very obliquely. Opaque objects, when laid upon a black ebony or a white ivory plate, put into the hole upon the stage, may be illuminated by candle-light transmitted through a double convex lens *αβ*; the stem of the frame *αε*, in which it turns, being put into the hole in the stage. The candle must be placed in a line drawn from the object through the middle of this lens, at such a distance from it as

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shall cause the spot of light upon the object-plate to be the narrowest. By day-light this lens gives little or no advantage to the direct sky-light.

Mr. Adams, in his "Essays," has described an improvement of this kind of microscope, which is as follows: A B (*Plate XIV. fig. 1.*) represents the body of the microscope, containing a double eye-glass and a body-glass: it is here shewn as screwed to the arm C D, from whence it may be occasionally removed, either for the convenience of packing, or when the instrument is to be used as a single microscope.

The eye-glasses and the body-glasses are contained in a tube which fits into the exterior tube A B; by pulling out a little this tube when the microscope is in use, the magnifying power of each lens is increased.

The body A B of the microscope is supported by the arm C D; this arm is fixed to the main pillar C F, which is screwed firmly to the mahogany pedestal G H; there is sometimes a drawer to this pedestal, which holds the apparatus.

N I S, the plate or stage which carries the slider-holder K L: this stage is moved up or down the pillar C F, by turning the milled nut M; this nut is fixed to a pinion, that works in a toothed rack cut on one side of the pillar. By means of this pinion, the stage may be gradually raised or depressed, and the object adjusted to the focus of the different lenses.

K L is a slider-holder, which fits into a hole that is in the middle stage N I S; it is used to confine and guide either the motion of the sliders which contain the objects, or the glass tubes that are designed to confine small fishes for viewing the circulation of the blood. The sliders are to be passed between the two upper plates, the tubes through the bent plates.

L is a brass tube, to the lower part of which is fixed the condensing lens for concentrating the light reflected up from the mirror O; it fits into the under part of the slider-holder K L, and may be set at different distances from the object, according to its distance from the mirror or the candle.

O is the frame which holds the two reflecting mirrors, one of which is plane, the other concave. These mirrors may be moved in various directions, in order to reflect the light properly, by means of the pivots on which they move, in the semicircle Q S R, and the motion of the semicircle itself on the pin S: the concave mirror generally answers best in the day-time; the plane mirror combines better with the condensing lens, and a lamp or candle. At D there is a socket for receiving the pin of the arm Q (*fig. 2.*) to which the concave speculum R, for reflecting light on opaque objects, is screwed. At S is a hole and slit for receiving either the nippers *abc* (*fig. 7.*), or the fish-pan (*fig. 8.*); when these are used, the slider-holder must be removed. A hole is made in the opposite side of the stage to receive the pin *g* of the convex lens S, *fig. 3.*

To use this microscope: Take it out of the box. Screw the body into the round end of the upper part of the arm C D. Place the brass sliders, which contain the magnifiers, into the dove-tailed slit which is on the under side of the aforesaid arm, as seen at E, and slide it forwards until the magnifier you mean to use is under the centre of the body: opposite to each magnifier in this slit there is a notch, and in the dove-tailed part of the arm C D there is a spring, which falls into the above-mentioned notch, and thus makes each magnifier coincide with the centre of the body. Pass the ivory slider you intend to use between the upper plates of the slider-holder K L, and then reflect as strong a light as you can on the object by means of one of the mirrors; after this, adjust the object to the focus of the magnifier and your eye, by turning the milled screw M, the motion of which raises and depresses the stage N I S. The degree of light necessary for each object, and the accuracy required in the adjustment

of the lenses to their proper focal distance from the object, will be easily attained by a little practice.

When *opaque* objects are to be examined, remove the slider-holder, and place the object on a flat glass, or fix it in the nippers (*fig. 7.*); the pin *c* of these fits into the hole on the stage; screw the concave speculum R into the arm Q (*fig. 2.*) and then pass the pin of this arm through the socket D, (*fig. 1.*) the light is now to be reflected from the concave mirror to the silver speculum, and from this down on the object. No exact rule can be given for reflecting the light on the object; we must therefore refer the reader to the mother of all aptness, practice. The speculum must be moved lower or higher, to suit the focus of the different magnifiers and the nature of the object.

The foregoing directions apply equally to the using of this instrument as a *single* microscope; with this difference only, that the body A B is then removed, and the eye is applied to the upper surface of the arm C D, exactly over the magnifiers.

This microscope is sometimes made with the following *alterations*, which are supposed to render it still more convenient and useful. The arm C D that carries the body and magnifiers is made both to turn on a pin, and to slide backwards and forwards in a socket at C; so that, instead of moving the objects below on the stage, and disturbing them, the magnifiers are more conveniently brought over any part of the objects as desired. The condensing glass is made larger, and slides upon the square bar C F quite distinct from the stage, like the mirrors below; and it is thereby made useful for any other objects that may be applied on glasses fitted to the stage, as well as those put into the slider-holder K. It is thereby not confined to this stage alone, as in the preceding. When the body A B is taken away, the arm C D may be slipped away from its bar, with the magnifiers, and the forceps, wire, and joint, applied to it as at *fig. 7.*; and it thereby serves the purpose of a small hand angle or opaque microscope, for any object occasionally applied to this wire. The magnifiers in the slider E are mounted in a wheel case, which perhaps prevents its being in the way so much as the long slider E before described. This contrivance is represented in *fig. 5.* and separated in *fig. 4.*

Mr. Martin's new universal compound microscope, which combines the uses and advantages of the single, compound, opaque, and aquatic microscopes, as now constructed by the opticians of London, is represented in *fig. 5.* A, B, D, is the body of the microscope; which consists of four parts, *viz.* A B the eye-piece, or that containing the eye-glasses, and is screwed into the top of a moveable or sliding tube which contains the body-glass screwed into its lower part. D is the exterior tube or case, in which the other slides up and down in an easy and steady manner. This motion of the interior tube is useful to increase or decrease the magnifying power of the body-glass when thought necessary, as before-mentioned. E is a pipe or snout screwed on to the body of the microscope D, and at its lower part, over the several magnifying lenses hereafter described. F G H I is the square stem of the microscope, upon which the stage R moves in an horizontal position, upward or downward, by means of the fine rack-work of teeth and pinion. K L is a strong solid joint and pillar, by which the position of the instrument is readily altered from a vertical one to an oblique or to a perfectly horizontal one, as may be required: it is thus well adapted to the ease of the observer either sitting or standing; and as it is very often convenient to view objects by direct unreflected light, when the square stem F I is placed in an horizontal position for this purpose, the mirror T is then to be taken off in order to prevent the obstruction of

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the rays. N O P, the tripod or foot by which the whole body of the microscope is steadily supported; these three arms fold up under each other at N, when packed into the case. W is a brass frame, that contains the condensing lens, and acts in conjunction with the large concave and plane mirrors below at T; the reflected rays from which, either of the common light or of that of a candle or lamp, it agreeably modifies, and makes steady in the field of view.

The particulars of the apparatus to this microscope are as follow: Q (see also *fig. 4.*) is a circular brass box, containing six magnifiers or object lenses, numbered 1, 2, 3, 4, 5, 6; the digits of which appear severally through a small round hole *y*, (*fig. 4.*) in the upper plate of it. To the upper side is fixed a small circle of brass *z*, by which it is connected with, and screwed into, the round end of the arm *abcd*; which is a long piece of brass, and moves through either by teeth or pinion, or not, as may be desired, in *ef*; which is a socket on the upper part of the pillar, and admits, with a motion both easy and steady, the brass arm. R is a fixed stage, upon which the objects to be viewed are to be placed: it is firmly fastened to the square pillar, which is moved by the rack-work. In the middle is a large circular hole, for receiving concave glasses, with fluids, &c. it has also a sliding spring-frame to fasten down slips of glass or other things: at *q t x* are three small sockets or holes, intended to receive several parts of the apparatus. S is the refractor, or illuminating lens, for converging the sun's rays upon opaque objects laid upon the stage R. On it may be fixed, as in *fig. 3.* to move in a semi-circle, fixing its long shank *g*, in a spring socket *h*, in the arm *t*; this arm moving every way by a stout pin *k* in the socket *t* of the stage. In this manner it is easily adjusted to any position of the sun, candle, &c.—T, the reflecting-glass frame, containing a concave and plane speculum, which is moved upon the square pillar by the hand. The use of it is to illuminate all transparent objects that are applied to the stage above.

Besides the apparatus represented, there is an auxiliary moveable stage; which by means of a pin is placed in the hole *t* of the stage R, and can be moved in an horizontal direction over the whole field of the stage. In this stage, there are three circular holes with shouldered bottoms; a large one in the middle, and on each side a small one, for the reception of the three following necessary articles: a watch-glass to be placed in the large hole, to hold fluids containing animalcules, &c.; a circular piece of ivory, one side of which is black, the other white, to support opaque objects of different contrived colours; and circular plane and concave glasses, for extemporaneous transparent objects.—The same use is made of the two small holes as of the large one, only in a lesser degree, to receive small concave glasses, plates, &c.

L (*fig. 6.*) is the silvered speculum, called a *Lieberkhun*, which makes the single opaque microscope, by being screwed to the slider *abc* (*fig. 5.*) in room of the box of lenses Q, and the body A E above it. The chief use of this is to view very small objects strongly illuminated near the compounded focus of the mirror T (*fig. 5.*) In *fig. 7.* are the forceps or pliers, for holding such kind of objects, and by which they can be applied very readily to the focus of the lens in the Lieberkhun. They have a motion all ways by means of the spring socket *a*, the joint *b*, and the shank *c*: they are placed with the pin *c* in the socket *t* of the fixed stage R (*fig. 5.*) and *7* is a small piece of ivory, to be placed upon the pointed end of the pliers: it is black upon one side, and white upon the other, to receive opaque objects.

R (*fig. 2.*) is a Lieberkhun of a larger size than that first mentioned, with a hole in its centre: this is screwed into

the hole Q of a brass ring, fastened to a long wire *d*; which moves up and down in the spring socket *x* of the stage R, (*fig. 5.*) in which it also moves sideways; and thus, with the body A E above, forms an *aquatic compound microscope* for showing all sorts of objects in water and other fluids placed under it in a watch-glass on the stage.

Sometimes a cone is used, with a proper aperture to exclude superfluous light, that would disturb a critical observation of a curious object; it is screwed to the under side of the fixed stage R.

There is what is usually called a *bug-box*, consisting of a concave glass with a plane one screwed over it; by means of which a bug, louse, flea, &c. may be secured and viewed alive. It is to be placed on the stage R.

Fig. 8. is the fish-pan. In the long concave body *a b*, a fish may be so confined by the ribband *c*, that the transparent tail may be in part over the slit or hole at *d*. In this state, it is placed on the stage R, with the pin *d* in the hole *t* of the stage, and moves freely and horizontally for viewing the circulation of the blood, &c.

A slider-holder may be placed on the stage R: it receives the sliders and tubes when filled with transparent objects, to be viewed either by the compound or single microscope.

Fig. 9. represents the ivory slider, to hold the objects between the tales as usual.

Fig. 10. is a useful auxiliary slider framed in brass. In this slider small concave glasses are cemented; and a slip of plane glass slides over them; by which any small living object, as mites, &c. may be confined without injury, and deliberately viewed.

The instrument has a set of glass tubes, three in number, one within another; they are useful for small tadpoles, water-nets, eels, &c. when the circulation of the blood is to be viewed. There is a small hole at one end of each tube, that serves to admit the air; for when they are filled with water, the other end is stopped with a cork.

A small ivory box, containing spare tales and wires, to supply the sliders with occasionally.

X, (*fig. 6.*) is a brass cell or button, containing a very small lens, properly set between two small plates of brass, that it may be brought very near to the object when viewed with it as a single microscope. This magnifier is screwed into the same hole as the wheel of six magnifiers Q are in *fig. 5.*

There is a lens, adapted to view and examine objects, by magnifying them sufficiently, so as to be able to apply them to the microscope for inspection: on this account it is called the *explorator*.

The preceding are the chief articles of the apparatus; which, on account of their being somewhat different from what is applied to other microscopes, we have been thus particular in describing. In using the microscope, and while viewing objects by either the single or compound instrument, the focal distances of the magnifiers are made perfectly exact by turning of the pinion at the nut *w*, in one way or the other, very gently in the teeth of the rack-work at the front of the bar F I.

It is necessary that the centres of the object lenses or magnifiers, the stage, and the mirrors at bottom, should all be in a right line in the axis of the microscope, when opaque objects are to be viewed, that are placed upon the ivory plate *7*, or the forceps, and all other such sorts of objects which are placed in the centre of the stage R, or the slider-holder: but when aquatic or living objects, which require a great space to move in, are to be viewed, then the horizontal motion at *ef* (*fig. 5.*) is made use of, and the view may be extended laterally over the whole of the diameter of the object or field of view; and by putting the arm *a b c* forward

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or backward in its socket *ef*, the view is extended in the contrary direction equally well; and in this manner the whole of the objects may be viewed without the least disturbance.

As the brass arm *abc* may be brought to the height of three or four inches above the stage R; so, by means of the rack-work motion of the stage, a lens of a greater focal distance than the greatest in the wheel Q may be occasionally applied in place of the wheel, and thereby the larger kind of objects be viewed; the instrument becoming, in this case, what is called a *megascopæ*. Two sizes of these lenses, furnished with Lieberkhuns, are shewn at L M, *fig. 6*.

In viewing moving living objects, or even fixed ones, when nice motions are requisite, a rack-work and pinion is often applied to the arm *abc*: the arm is cut out with teeth; and the pinion, as shewn at Y, is applied to work it. This acts but in one direction; and, in order to produce an equally necessary motion perpendicular to this, rack-work and pinion is applied tangent-wise to the stage, which is then jointed.

To fit microscopes, as well as telescopes, to short-sighted eyes, the object-glass and the eye-glass must be placed a little nearer together, so that the rays of each pencil may not emerge parallel, but may fall diverging upon the eye.

MICROSCOPE, *Reflecting*, is properly that which magnifies by reflection, as the above-mentioned ones do by refraction.

The structure of such a microscope may be conceived thus: near the focus of a concave speculum, AB (*Plate XIII. fig. 3*.) place a minute object C, that its image may be formed larger than itself in D; to the speculum join a lens, convex on both sides, EF, so as the image D may be in its focus.

The eye will here see the image inverted, but distinct, and enlarged; consequently, the object will be larger than if viewed through the lens alone.

The inventor of this microscope is the great sir I. Newton; but the objects appear dim in it.

Any telescope is converted into a microscope, by removing the object-glass to a greater distance from the eye-glass. And since the distance of the image is various, according to the distance of the object from the focus; and it is magnified the more, as its distance from the object-glass is greater; the same telescope may be successively converted into microscopes, which magnify the object in different degrees.

The construction of this microscope is more particularly explained in *fig. 4*, in which, instead of the lens *def*, there is placed a small speculum *def*; so that the object *acb* being placed above it, at a little greater distance from the focus *g*, has its image ACB, formed by reflection, as in the other case it was by refraction, through the lens *df*. Now if we suppose the focal distance of the object speculum *def*, and lens *def* the same, the effect of the microscope in other respects will be the same also.

For the distance of the object *ab* above the speculum, will be equal to the distance of the object *ab* below the lens, in order that the image may be formed at the same distance *ce*. The position of the object will be inverted; for all the rays flowing from the point *a*, will be reflected by the speculum to the point A, in the same manner as if they came by refraction through the lens from the point *a*. Thus the part *b* in the object will be reflected to the focus B in the image, which, therefore, is inverted. The power of magnifying will also be the same in this and in the reflecting telescope of a similar construction. For since the image AB and the object *ab* are seen under equal angles from the vertex *e* of the speculum, the triangles *acb*, and A*CB* will be similar, and therefore $AB : ab :: Ce : ce$; but in the other it is $AB : a b :: Ce : ce$. But the latter ratio of these analogies is the same in both, and consequently the first is so too. This microscope is not so easy to manage as the common sort. For vision by reflection,

as it is much more perfect, so it is far more difficult than that by refraction. Nor is this microscope so useful for any but very small or transparent objects. For the object, being between the speculum and image, would, if it were large and opaque, prevent a due reflection.

In Dr. Smith's reflecting microscope there are two reflecting mirrors, one concave and the other convex, and the image is viewed by a lens. To explain it, let AD (*fig. 5*.) be a large concave speculum, and *ada* a small convex one, each perforated in the middle with the holes BC, *bc*. Both these are segments of the same sphere, or ground on tools of an equal radius, *viz.* of two inches, that so the focal distance of each speculum may be just one inch.

These two speculums are placed at the distance of about $1\frac{1}{2}$ inch from each other, that so an object OPQ, being placed a little below the smaller speculum, might be between the focus F and centre E of the larger speculum. Things thus circumstanced, the rays PA, PD, which flow from the point P in the object, on the speculum AD, will be reflected towards a focus *p*; where an image *opq* would be formed, if the rays were not intercepted by the convex speculum *ad*; and the point *p* being nearer than its focus *f*, the rays A*a*, D*d*, which tend or converge towards it, will be reflected to a focus P, where the last image, OPQ, will be formed, to be viewed through the eye-glass G, by the eye at I.

This microscope, though far from being executed in the best manner, performed, Dr. Smith says, nearly as well as the very best refracting microscopes; so that he did not doubt, but that it would have excelled them, if it had been executed properly. Dr. Smith's own account of this instrument may be seen in his Optics, Remarks, p. 94.

MICROSCOPE, *Solar*, called also the *camera obscura* microscope, was invented by Mr. Lieberkuhn in 1738 or 1739, and is composed of a tube, a looking-glass, a convex lens, and a Wilson's microscope. The tube *e* (*fig. 6*.) is brass near two inches in diameter, fixed in a circular collar of mahogany, with a groove on its periphery on the outside, denoted by 2, 3, and connected by a cat-gut to the pulley 4 on the upper part; which turning round at pleasure, by the pin 5 within, in a square frame, may be adjusted easily to a hole in the shutter of a window, by the screws 1, 1, in such a manner that no light can pass into the room, but through the aforesaid tube *e*. Fastened to the frame by hinges, on the side that goes without the window, is a looking-glass G, which, by means of a jointed brass-wire, 6, 7, and the screw H 8, coming through the frame, may be moved either vertically or horizontally, to throw the sun's rays through the brass tube into the darkened room. The end of the brass tube without the shutter has a convex lens, 5, to collect the rays, thrown on it by the glass G, and bring them to a focus in the other part, where D is a tube sliding in and out, to adjust the object to a due distance from the focus; and to the end G of another tube F, is screwed one of Wilson's simple pocket microscopes, containing the object to be magnified in a slider; and by the tube F, sliding on the small end E of the other tube D, it is brought to a true focal distance.

The solar microscope has been introduced into the small and portable, as well as the large camera obscura; and if the image be received upon a piece of half-ground glass, shaded from the light of the sun, it will be sufficiently visible. M. Lieberkuhn made considerable improvements in his solar microscope, particularly in adapting it to the view of opaque objects; and M. Æpinus, Nov. Com. Petrop. vol. ix. p. 326, has contrived, by throwing the light upon the fore-side of any object, before it is transmitted through

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the object lens, to represent with equal advantage all kinds of objects by it. In this improvement, the body of the common solar microscope is retained, and only an addition made of two brass plates, CA and BA (*fig. 7.*) joined by a hinge, and kept at a proper distance by a screw. A section of these plates, and of all the necessary parts of the instrument, may be seen in *fig. 8.*, where *c, a.* represent rays of the sun converging from the illuminating lens, and falling upon the mirror *db*, which is fixed to the nearer of the brass plates. From this they are thrown upon the object at *ef*, and thence are transmitted through the object lens at K, and a perforation in the farther plate, upon a screen, as usual. The use of the screw *n* is to vary the distance of the two plates, and thereby to adjust the mirror to the object with the greatest exactness. A very considerable improvement may be made in the solar microscope, by substituting Ramsden's achromatic eye-piece instead of the convex object-lens. For M. Euler's method of introducing vision by reflected light into this microscope, see *MAGIC lantern.*

An improved solar microscope, as used with the improved single microscope, with teeth and pinions, is exhibited in *Plate XV. figs. 1, 2, and 3.* The former figure represents the whole form of the single microscope; the parts of which are as follows: ABCD the external tube; GHIK the internal moveable one; QM part of another tube within the last, at one end of which is fixed a plate of brass hollowed in the middle, for receiving the glass tubes: there is also a moveable flat plate, between which, and the fixed end of the second tube, the ivory sliders are to be placed. L, a part of the microscope, containing a wire spiral spring, keeping the tube QM with its plates firm against the fixed part I K of the second tube.

E F is the small rack-work of teeth and pinions, by which the tube I G is moved gradually to or from the end A B, for adjusting the objects exactly to the focus of different lengths. NO is a brass slider, with six magnifiers; any one of which may easily be placed before the object. It is known when either of the glasses is in the centre of the eye-hole, by a small spring falling into a notch in the side of the slider, made against each of the glasses. Those parts of the apparatus before described, viz. iron-sliders, with holder, glass tubes, forceps, Lieberkhuns, buttons, &c. &c. are made use of to this microscope. GH is a brass cell, which holds an illuminating glass for converging the sun's beams, or the light of a candle strongly upon the objects. The aperture of the glass is made greater or less, by two circular pieces of brass, with holes of different sizes, that are screwed separately over the said lens. But at times, objects appear best, when the microscope is held up to the common light only, without this glass. It is also taken away when the microscope is applied to the apparatus now to be described.

Fig. 2. represents the apparatus, with the single microscope screwed to it, which constitutes the solar microscope. A B is the inner moveable tube, to which the single microscope is screwed. CD is the external tube, containing a condensing convex glass at the end D, and is screwed into the plate E F, which is cut with teeth at its circumference, and moved by the pinion I, that is fixed with the plate G H. This plate is screwed fast against the window-shutter, or board fitted to a convenient window of a darkened room, when the instrument is used. KL is a long frame, fixed to the circular plate E F; containing a looking-glass or mirror for reflecting the solar rays through the lens in the body of the tube D. O is a brass milled head, fastened to a worm or endless screw; which on the outside turns a

small wheel, by which the reflecting mirror M is moved upwards or downwards.

In using this microscope, the square frame GH is first to be screwed to the window-shutter, and the room well darkened: which is best done by cutting a round hole of the size of the moveable plate E F, that carries the reflector, in the window-shutter or board; and by means of two brass nuts *a, a.* let into the shutter to receive the screws P, P, when placed through the holes in the square frame GH, at the two holes Q, Q; which will firmly fasten the microscope to the shutter, and is easily taken away by only unscrewing the screws P, P.

A white paper screen, or white cloth to receive the images, is to be placed several feet distant from the window: which will make the representations the larger in proportion to the distance. The usual distances are from six to 16 feet.

The frame KL, with its mirror M, is to be moved by turning the pinion I, one way or the other, till the beams of the sun's light come through the hole into the room: then, by turning of the worm at O, the mirror must be raised or depressed, till the rays become perfectly horizontal, and go straight across the room to the screen. The tube CD, with its lens at D, is now to be screwed into the hole of the circular plate E F: by this glass the rays will be converged to a focus; and from thence proceed diverging to the screen, and there make a large circle of light. The single microscope, (*fig. 1.*) is to be screwed on to the end A B (*fig. 2.*) of the inner tube; and the slider NO, with either of the lenses marked 1, 2, 3, 4, 5, or 6, in the centre of the hole at the end A B. This will occasion a circle of light upon the screen much larger than before. The slider or glass tube, with the objects to be viewed, is to be placed between the plates at I K against the small magnifier, and moved at pleasure. By shifting the tube A B in or out, you may place the object in such a part of the condensed rays as shall be sufficient to illuminate it, and not scorch or burn it; which will generally require the glass to be about one inch distant from the focus. It now remains only to adjust the object, or to bring it so near to the magnifier that its image formed upon the screen shall be the most distinct or perfect: and it is effected by gently turning the pinion F, (*fig. 1.*) a small matter one way or the other. If the object be rather large in size, the least magnifiers are generally used, and *vice versa*.

N^o 1. is the greatest magnifier, and N^o 6. the least, in the brass slider NO. But, if desired, single lenses of greater magnifying powers are made: and they are applied, by being screwed to the end A B, (*fig. 1.*) and the brass slider NO is then taken away.

The same object may be variously magnified, by the lenses severally applied to it; and the degree of magnifying power is easily known by this rule: *As the distance of the object is to that of its image from the magnifier; so is the length or breadth of the object to that of the image.*

Instead of the brass sliders with the lenses N, O; there is sometimes screwed a lens of a large size, and longer focal distance: the instrument is then converted into a *megascroscope*; and is adapted for viewing the larger kind of objects contained in larger sliders, such as is represented at R (*fig. 3.*) And, in the same manner, small objects of entertainment, painted upon glass like the sliders of a magic lantern; are much magnified, and represented upon the same screen.

The *lucernal* microscope of Mr. Adams, as mounted to view opaque objects, is represented in *fig. 4.* ABCD is a large mahogany pyramidal box, which forms the body of the microscope; it is supported firmly on the brass pillar

MICROSCOPE.

F, G, by means of the socket H and the curved piece I K.

L M N is a guide for the eye, in order to direct it in the axis of the lenses; it consists of two brass tubes, one sliding within the other, and a vertical flat piece, at the top of which is the hole for the eye. The outer tube is seen at M N, the vertical piece is represented at L M. The inner tube may be pulled out or pushed in, to adjust it to the focus of the glasses. The vertical piece may be raised or depressed, that the hole, through which the object is to be viewed, may coincide with the centre of the field of view; it is fixed by a milled screw at M, which could not be shewn in this figure.

At N is a dove-tailed piece of brass, made to receive the dove-tail at the end of the tubes M, N, by which it is affixed to the wooden box A B C D E. The tubes M, N, may be removed from this box occasionally, for the convenience of packing it up in a less compass.

O P, a small tube which carries the magnifiers.

O, one of the magnifiers; it is screwed into the end of a tube, which slides within the tube P; the tube P may be unscrewed occasionally from the wooden body.

Q R S T V X, a long square bar, which passes through the sockets Y, Z, and carries the stage or frame that holds the objects; this bar may be moved backward or forward, in order to adjust it to the focus by means of the pinion which is at *a*.

b, a handle furnished with an universal joint, for more conveniently turning the pinion. When the handle is removed, the nut (*fig. 5.*) may be used in its stead.

d, a brass bar, to support the curved piece K I, and keep the body A B firm and steady.

f g h i, the stage for opaque objects: it fits upon the bar Q R S T by means of the socket *h i*, and is brought nearer to or removed farther from the magnifying lens by turning the pinion *a*: the objects are placed in the front side of the stage (which cannot be seen in this figure) between four small brass plates: the edges of two of these are seen at *k l*. The two upper pieces of brass are moveable; they are fixed to a plate, which is acted on by a spiral spring, that presses them down, and confines the slider with the objects: this plate, and the two upper pieces of brass, are lifted up by the small nut *m*.

At the lower part of the stage, there is a semicircular lump of glass *n*, which is designed to receive the light from the lamp (*fig. 29.*), and to collect and throw it on the concave mirror *o*, whence it is to be reflected on the object.

The upper part *f g r s* (*fig. 4.*) of the opaque stage taken out, that the stage for transparent objects may be inserted in its place.

Fig. 6. represents the stage for transparent objects; the two legs 5 and 6 fit into the top of the under part *r s h i* of the stage for opaque objects; 7 is the part which confines or holds the sliders, and through which they are to be moved; 9 and 10 a brass tube, which contains the lenses for condensing the light, and throwing it upon the object: there is a second tube within that, marked 9 and 10, which may be placed at different distances from the object by the pin 11.

When this stage is used as a single microscope, without any reference to the lucernal, the magnifiers, or object lenses, are to be screwed into the hole 12, and to be adjusted to a proper focus by the nut 13.

N. B. At the end A B (*fig. 4.*) of the wooden body there is a slider, which is represented as partly drawn out at A; when quite taken out, three grooves will be perceived; one of which contains a board that forms the end

of the box; the next contains a frame with a greyed glass; and the third, or that farthest from the end A B, two large convex lenses.

In the use of this microscope for examining opaque objects, take out the wooden slider A (*fig. 4.*), then lift out the cover and the grey glass from their respective grooves under the slider A.

Put the end N of the guide for the eye L M N into its place, so that it may stand in the position which is represented in this figure.

Place the socket, which is at the bottom of the opaque stage, on the bar Q X T, so that the concave mirror *o* may be next the end D E of the wooden body.

Screw the tubes P, O, into the end D E. The magnifier you intend to use is to be screwed on the end O of these tubes.

The handle G *b*, or the milled nut (*fig. 5.*), must be placed on the square end of the pinion *a*.

Place the lamp lighted before the glass lump *n*, and the object you intend to examine between the spring-plates of the stage; and the instrument is ready for use.

In all microscopes there are two circumstances, which must be particularly attended to: first, the modification of the light, or the proper quantity to illuminate the object; secondly, the adjustment of the instrument to the focus of the glasses and eye of the observer. In the use of the lucernal microscope there is a third circumstance, which is, the regulation of the guide for the eye.

1. To throw the light upon the object. The flame of the lamp is to be placed rather below the centre of the glass lump *n*, and as near it as possible; the concave mirror *o* must be so inclined and turned as to receive the light from the glass lump, and reflect it thence upon the object: the best situation of the concave mirror and the flame of the lamp depends on a combination of circumstances, which a little practice will discover.

2. To regulate the guide for the eye, or to place the centre of the eye-piece L so that it may coincide with the focal point of the lenses and the axis of vision: Lengthen and shorten the tubes M, N, by drawing out or pushing in the inner tube, and raising or depressing the eye-piece M L, till you find the large lens (which is placed at the end A B of the wooden body) filled by an uniform field of light, without any prismatic colours round the edge; for till this piece is properly fixed, the circle of light will be very small, and only occupy a part of the lens: the eye must be kept at the centre of the eye-piece L, during the whole of the operation; which may be rendered somewhat easier to the observer, on the first use of the instrument, if he hold a piece of white paper parallel to the large lens, removing it from or bringing it nearer to them till he find the place, where a lucid circle, which he will perceive on the paper, is brightest and most distinct; then he is to fix the centre of the eye-piece to coincide with that spot; after which a very small adjustment will set it perfectly right.

3. To adjust the lenses to their focal distance. This is effected by turning the pinion *a*, the eye being at the same time at the eye-piece L. The grey glass is often placed before the large lenses, while regulating the guide for the eye, and adjusting for the focal distance.

If the observer in the process of his examination of an object, advance rapidly from a shallow to a deep magnifier, he will save himself some labour by pulling out the internal tube at O.

The upper part *f g r s* of the stage is to be raised or lowered occasionally, in order to make the centre of the object coincide with the centre of the lens at O.

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To delineate objects, the grey glass must be placed before the large lenses; the picture of the object will be formed on this glass, and the outline may be accurately taken by going over the picture with a pencil.

The opaque part may be used in the day-time without a lamp, provided the large lenses at A B are screened from the light.

To use the Lucernal Microscope in the Examination of transparent Objects.—The instrument is to remain as before: the upper part *fgs* of the opaque stage must be removed, and the stage for transparent objects, represented at *fig. 6*, put in its place; the end *g 10* to be next the lamp.

Place the greyed glass in its groove at the end A B, and the objects in the slider-holder at the front of the stage; then transmit as strong a light as you are able on the object, which you will easily do by raising or lowering the lamp.

The object will be beautifully depicted on the grey glass: it must be regulated to the focus of the magnifier, by turning the pinion *a*.

The object may be viewed either with or without the guide for the eye. A single observer will see an object to the greatest advantage by using this guide, which is to be adjusted, as we have described above. If two or three wish to examine the object at the same time, the guide for the eye must be laid aside.

Take the large lens out of the groove, and receive the image on the grey glass; in this case, the guide for the eye is of no use: if the grey glass be taken away, the image of the object may be received on a paper screen.

Take out the grey glass, replace the large lenses, and use the guide for the eye; attend to the foregoing directions, and adjust the object to its proper focus. You will then see the object in a blaze of light almost too great for the eye, a circumstance that will be found very useful in the examination of particular objects. The edges of the object in this mode will be somewhat coloured: but as it is only used in this full light for occasional purposes, it has been thought better to leave this small imperfection, than, by remedying it, to sacrifice greater advantages; the more so, as this fault is easily corrected, and a new and interesting view of the object is obtained, by turning the instrument out of the direct rays of light, and permitting them to pass through only in an oblique direction, by which the upper surface is in some degree illuminated, and the object is seen partly as opaque, partly as transparent. It has been already observed, that the transparent objects might be placed between the slider-holders of the stage for opaque objects, and then be examined as if opaque.

Some transparent objects appear to the greatest advantage when the lens at *g 10* is taken away; as, by giving too great a quantity of light, it renders the edges less sharp.

The variety of views which may be taken of every object, by means of the improved lucernal microscope, will be found to be of great use to an accurate observer: it will give him an opportunity of correcting or confirming his discoveries, and investigating those parts in one mode which are invisible in another.

To throw the Image of transparent Objects on a Screen, as in the Solar Microscope.—It has been long a microscopical desideratum, to have an instrument by which the image of transparent objects might be thrown on a screen, as in the common solar microscope: and this not only because the sun is so uncertain in this climate, and the use of the solar microscope requires confinement in the finest part of the day, when time seldom hangs heavy on the mind; but as it also affords an increase of pleasure, by displaying its wonders to several

persons at the same instant, without the least fatigue to the eye. This purpose is now effectually answered, by affixing the transparent stage of the lucernal to a lantern, with one of Argand's lamps.—The lamp is placed within the lantern, and the end *g 10* of the transparent stage is screwed into a female screw, which is rivetted in the sliding part of the front of the lantern; the magnifying lenses are to be screwed into the hole represented at *12*, and they are adjusted by turning the milled nut. The quantity of light is to be regulated by raising and lowering the sliding plate or the lamp.

Apparatus which usually accompanies the improved Lucernal Microscope.—The stage for opaque objects, with its semicircular lump of glass, and concave mirror. The stage for transparent objects, which fits on the upper part of the foregoing stage. The sliding tube, to which the magnifiers are to be affixed: one end of these is to be screwed on the end D of the wooden body; the magnifier in use is to be screwed to the other end of the inner tube. There are eight magnifying lenses, so constructed, that they may be combined together, and thus produce a very great variety of magnifying powers. A fish-pan, such as is represented at *Plate XIV. fig. 8*. A steel wire, with a pair of nippers at one end, and a small cylinder of ivory at the other. (*Plate XIV. fig. 7.*) A slider of brass, containing a flat glass slider, and a brass slider, into which are fitted some small concave glasses. A pair of forceps. Six large, and six small ivory sliders, with transparent objects. Fourteen wooden sliders, with four opaque objects in each slider; and two spare sliders. Some capillary tubes for viewing small animalcula. One of the improved Argand lamps, which are the most suitable for microscopic purposes, either with this or any other instrument, on account of the clearness, intensity, and steadiness of the light. A description of its structure will be found under the article LAMP.

The Microscope for opaque objects was also invented by M. Lieberkuhn about the same time with the former, and remedies the inconvenience of having the dark side of an object next the eye; for by means of a concave speculum of silver, highly polished, in whose centre a magnifying lens is placed, the object is so strongly illuminated, that it may be examined with ease. A convenient apparatus of this kind, with four different speculums and magnifiers of different powers, was brought to perfection by Mr. Cuff. *Phil. Trans. N^o 458. § 9.*

The several parts of this instrument, made either of brass or silver, are as follows:

Through the first side A (*Plate XV. fig. 7.*) passes a fine screw B, the other end of which is fastened to the moveable side C.—D is a nut adapted to the said screw, by the turning of which the two sides A, C, are gradually brought together.—E is a spring of steel, that separates the said two sides when the nut is unscrewed.—F, a piece of brass turning round in a socket, whence proceeds a small spring tube moving upon a rivet, through which tube there runs a steel wire, one end of which terminates in a sharp point G, and the other hath a pair of plyers, H, fastened to it.—The point and plyers are to thrust into or take up and hold any insect or object: and either of them may be turned upwards, as suits your purpose best.—I, a ring of brass with a female screw within it, mounted on an upright piece of the same metal, which turns round on a rivet, that it may be set at a due distance when the least magnifiers are employed.—This ring receives the screws of all the magnifiers.—K, a concave speculum of silver, polished as bright as possible, in the centre of which a double convex lens is placed, with a proper aperture to look through it. On the back of this speculum a male screw,

screw, L, is made fit to the brass ring I to screw into the said ring at pleasure.

There are four of these concave specula, of different depths, adapted to four glasses of different magnifying powers, to be used as objects to be examined may require. The greatest magnifiers are known by having the least apertures. M, a round object-plate, one side white and the other black, intended to render objects the more visible, by placing them, if black upon the white, and if white on the black side. A steel spring N turns down on each side to make any object fast; and issuing from the object-plate is a hollow pipe, to screw it on the needle's point G.—O, a small box of brass, with a glass on each side, contrived to confine any living object, in order to examine it: this also has a pipe to screw upon the end of the needle G.—P, a turned handle of wood, to screw into the instrument when it is made use of.—A pair of brass plyers accompanies this instrument to take up any object, or manage it with convenience: and a soft hair brush, to clean the glasses or specula, or apply a drop of any liquid to the insides of the box O, in order to view the animalcules.—Also, a small ivory box for insid-glasses, to be placed, when wanted, in the small brass box O.

When you would view any object, screw the speculum, with the magnifier you think best to use, into the brass ring I. Place your object either on the needle G, in the plyers H, on the object-plate M, or in the brass hollow box O, as may be most convenient, according to the nature and condition of it: then holding up your instrument by the handle P, look again! the light, through the magnifying lens, and by means of the nut, D, together with the motion of the needle, by managing its lower end the object may be turned about, raised, or depressed, brought nearer the glass, or put farther from it, till you hit the true focal distance, and the light be seen reflected from the speculum strongly upon the object: by which means it will be shewn in a manner surprisingly distinct and clear. And for this purpose the light of the sky, or of a candle, will answer to your satisfaction.

This microscope is principally intended for opaque objects, but transparent ones may also be viewed by it: observing only, that when such come under examination, it will not always be proper to throw on them the light reflected from the speculum: for the light transmitted through them, meeting the reflected light, may, together, produce too great a glare. A little practice will teach how to regulate both these lights to good advantage. For an account of microscopes attached to astronomical instruments, and designed for assisting the observer to read off minute divisions; see CIRCLE.

MICROSCOPIC OBJECTS. All things too minute to be viewed distinctly by the naked eye, are proper objects for the microscope. Dr. Hooke has distinguished them to be exceeding small bodies, exceeding small pores, or exceeding small motions.

Exceeding small bodies must either be the parts of larger bodies, or things, the whole of which is exceedingly minute, such as small seeds, insects, salts, sands, &c.

Exceeding small pores are the interstices between the solid parts of bodies, as in stones, minerals, shells, &c. or the mouths of minute vessels in vegetables, or the pores in the skin, bones, and other parts of animals.

Exceeding small motions are the movements of the several parts or members of minute animals, or the motion of the fluids, contained in either animal or vegetable bodies. Under one or other of these three heads, almost every thing about us affords us matter of observation, and may conduce both to our amusement and instruction.

An examination of these objects, however, so as to discover truth, requires a great deal of attention, care, and patience, with some skill and dexterity, to be acquired chiefly by practice, in the preparing, managing, and applying them to the microscope.

Whatever object offers itself as the subject of our examination, the size, contexture, and nature of it, are first to be considered, in order to apply it to such glasses, and in such a manner as may shew it best. The first step should always be to view the whole together, with such a magnifier as can take it in all at once, and after this the several parts of it may the more fitly be examined, whether remaining on the object, or separated from it. The smaller the parts are which are to be examined, the more powerful should be the magnifiers employed; the transparency or opacity of the object must also be considered, and the glasses employed accordingly suited to it; for a transparent object will bear a much greater magnifier than one which is opaque, since the nearness that a glass must be placed at, unavoidably darkens an object if in its own nature opaque, and renders it very difficult to be seen, unless by the help of the apparatus contrived for that purpose, which has a silver speculum. Most objects, however, become transparent by being divided into extremely thin parts.

The nature of the object also, whether it be alive or dead, a solid or a fluid, an animal, a vegetable, or a mineral substance, must likewise be considered, and all the circumstances of it attended to, that we may apply it in the most advantageous manner. If it be a living object, care must be taken not to squeeze or injure it, that we may see it in its natural state and full perfection. If it be a fluid, and that too thick, it must be diluted with water; and if too thin, we should let some of its watery parts evaporate. Some substances are fittest for observation when dry, others when moistened; some when fresh, and others after they have been kept some time.

Light is the next thing to be taken care of; for on this the truth of all our observations depends; and a very little observation will shew how very different objects appear in one degree of it to what they do in another: so that every new object should be viewed in all degrees of light, from the greatest glare of brightness to perfect obscurity, and that in all positions to each degree, till we hit upon the certain form and figure of it. In many objects it is very difficult to distinguish between a prominence and a depression, a black shadow, and a black stain, and in colour between a bright reflection and whiteness. The eye of a fly, in one kind of light, appears like a lattice drilled full of holes; in the sunshine like a solid substance, covered with golden nails; in one position like a surface covered with pyramids, in another with cones, and in others with still different shapes.

The degree of light must always be suited to the object; if that be dark, it must be seen in a full and strong light, but if transparent, the light should be proportionably weak: for which reason there is a contrivance both in the single and double microscope to cut off abundance of the rays, when such transparent objects are to be examined by the largest magnifiers. The light of a candle for many objects; and especially for such as are very bright and transparent, and very minute, is preferable to day-light; for others a serene day-light is best; but sun-shine is the worst light of all, for it is reflected from objects with so much glare, and exhibits such gaudy colours, that nothing can be determined from it with any certainty. This, however, is not to be extended to the solar, or camera obscura microscope; for in that nothing but sun-shine can do, and the brighter that is, the better; but in that way we do not see the object itself on
which

which the sun-shine is cast, but only the image or shadow of it exhibited on a screen; and therefore no confusion can arise from the glaring reflection of the sun's rays from the object to the eye, which is the case in other microscopes. But then in that solar way we must rest contented with viewing the true form and shape of an object, without expecting to find its natural colour; since no shadow can possibly wear the colour of the body it represents.

Moll objects require also some management, in order to bring them properly before the glasses. If they are flat and transparent, and such as will not be injured by pressure, the best way is to enclose them in sliders between two Muscovy tales or singlass. In this way the feathers of butterflies, the scales of fishes, and the *varioæ* of flowers, may be very conveniently preserved, as also the parts of insects, the whole bodies of minute ones, and a great number of other things. These are to be kept in sliders, each containing three, four, or more holes, and these must not be filled promiscuously; but all the things preserved in one slider should be such as require one and the same magnifying power to view them, that there may not be a necessity of changing the glasses for every object; and the sliders should be marked with the number of the magnifier it is proper to be viewed with. In placing the objects in the sliders, it is always proper to have a small magnifier, of about an inch focus, in your hand, to examine and adjust them by, before they are fixed down with the rings.

Small living objects, such as lice, fleas, bugs, mites, minute spiders, &c. may be placed between these tales without injuring them, if care be taken to lay on the brass rings without pressing them down, and they will remain alive many weeks in this manner; but if they are too large to be treated thus, they should be either preserved between two concave glasses, or else viewed immediately, by holding them in the pincers, or sticking them on the point at the other end of that instrument.

If fluids come under examination, to discover the animalcules in them, a small drop is to be taken with a hair-pencil; or on the nib of a clean pen, and placed on a plate of glass; and if they are too numerous to be thus seen distinctly, some water warmed, by holding it in the mouth, must be added to the drop, and they will then separate, and be seen distinctly. This is particularly necessary in viewing the animalcules in the *semen masculinum* of all creatures; which, though extremely minute, are always so numerous, that without this caution their true form can seldom be seen. But if we are to see the salts in a fluid, the contrary method must be observed, and the plate of glass must be held gently over the fire, till part of the liquor is evaporated.

The dissection of minute animals, as lice, fleas, &c. requires patience and care; but it may be done very accurately by means of a needle and a fine lancet, placing the creature in a drop of water, for then the parts will readily unfold themselves, and the stomach, guts, &c. be very distinctly seen.

These seem the best ways of preserving transparent objects; but the opaque ones, such as seeds, woods, &c. require a very different treatment, and are best preserved and viewed in the following manner.

Cut cards into small slips about half an inch long, and a tenth of an inch broad; wet these half way of their length in gum-water, and with that fasten on several pieces of the object, and as the spots of cards are of different colours, such should be chosen for every object as are the most different from its own colours. These are very convenient for viewing by the microscope made for opaque objects with the sil-

vered speculum; but they are proper for any microscope that can view opaque bodies.

A small box should be contrived for these slips, with little shallow holes for the reception of each; and this is conveniently done, by cutting pieces of paste-board, such as the covers of books are made of, to the size of the box, so that they will just go into it, and then cutting holes through them with a small chisel, of the shape of the slips of card, these paste-boards having then a paper pasted over their bottom, are cells very proper for the reception of these slips, which may be taken out by means of a pair of pincers, and will always be ready for use.

Great caution is to be used in forming a judgment on what is seen by the microscope, if the objects are extended or contracted by force or dryness.

Nothing can be determined about them, without making the proper allowances; and different lights and positions will often shew the same object as very different from itself. There is no advantage in any greater magnifier than such as is capable of shewing the object in view distinctly; and the less the glass magnifies, the more pleasantly the object is always seen.

The colours of objects are very little to be depended on, as seen by the microscope; for their several component particles being by this means removed to great distances from one another, may give reflections very different from what they would, if seen by the naked eye.

The motions of living creatures also, or of the fluids contained in their bodies, are by no means to be hastily judged of, from what we see by the microscope, without due consideration; for as the moving body, and the space in which it moves, are magnified, the motion must be so too; and therefore that rapidity with which the blood seems to pass through the vessels of small animals must be judged of accordingly. Suppose, for instance, that a horse and a mouse move their limbs exactly at the same time, if the horse runs a mile while the mouse runs fifty yards; though the number of steps are the same in both, the motion of the horse must notwithstanding be allowed the swiftest; and the motion of a mite, as viewed by the naked eye, or through the microscope, is perhaps not less different. Baker's Microscope, p. 52. 62. Adams on the Microscope. See ANIMALCULES and *Plates of Microscopic Objects*.

MICROSTEMMA, in Botany, from μικρός, *small*, and στεμμα, *a crown*, alluding to the sort of coronet which accompanies the anthers.—Brown Tr. of the Wern. Soc. v. 1. 25. Prodr. Nov. Holl. v. 1. 459.—Class and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juss. *Asteraceæ*, Brown.

Ess. Ch. Corolla wheel-shaped, five-cleft. Crown of the stamens of one leaf, fleshy, with five lobes, alternate with the anthers, which are without any membranous point. Masses of pollen attached laterally by the middle, lying over the stigma, which is pointless. Follicles slender, smooth. Seeds comose.

1. *M. tuberosum*. Br.—Native of New Holland, within the tropic. A smooth upright perennial herbaceous plant, with a tuberous root. Stem simple in the lower part, and furnished with minute leaves; branched above. Leaves opposite, linear. Umbels lateral and terminal, nearly sessile. Corolla blackish-purple, bearded at the inside.

MICROTEA, named by Professor Swartz, from μικροτή, *smallness*, on account of the parts of fructification being extremely minute, compared with others of its natural order.—Swartz Prod. 53. Ind. Occ. 542. Schreb. 797. Willd. Sp. Pl. v. 1. 1309. Mart. Mill. Dict. v. 3. Lamarck

Illustr. t. 182. Class and order, *Pentandria Digynia*. Nat. Ord. *Holeraceae*, Linn. *Atriplices*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five, oblong, permanent leaves. *Cor.* none. *Stam.* Filaments five, thread-shaped, the length of the calyx, inserted into the receptacle; anthers rather globose. *Pist.* Germen superior, roundish, echinated; styles two, very short, divaricated; stigmas simple. *Peric.* a dry, leathery, slender drupa, beset with prickles. *Seed*, a roundish, smooth nut, with a single kernel.

Ess. Ch. Calyx of five leaves, spreading. Corolla none. Drupa dry and prickly. Seed roundish, covered with a leathery, echinated bark.

1. *M. debilis*. Willd. n. 1. Swartz Ind. Occ. t. 12.—(Schollera; Rohr A&S. Soc. Hafn. v. 2. p. 1. 210.)—A native of several of the West India islands.—The whole plant is smooth, and about a foot in height. *Stem* herbaceous, branched, diffuse, nearly erect, striated. *Branches* irregular, diverging, weak, spreading. *Leaves* alternate, on stalks, ovato-lanceolate, pointed, entire, nerved, veinless, rather succulent, and of a dark green colour. *Flower-stalks* terminal or lateral, opposite to the leaves, each bearing two, slender, rather close. *Clusters* of numerous, nearly upright flowers, mostly directed one way, on separate, short stalks, very minute, greenish-white. *Bractees* lanceolate, pellucid. *Drupa* the size of mustard-seed, with very minute, prickly-edged cells all over the surface. *Nut* black and shining; or it may be considered as a seed covered with a leathery, prickly, or muricated bark.

Mr. Van Rohr, in the Copenhagen Transactions, named this plant which was communicated to him by Jacquin, *Schollera*, in honour of the author of *Flora Barbienfis*.

MICROTIS, so named by Mr. Brown, from μικρός, small, and ως, ωτος, an ear, alluding to a pair of minute ear-like appendages to the anther. Brown Prodr. Nov. Holl. v. 1. 320.—Class and order, *Gynandria Monandria*. Nat. Ord. *Orchidæ*.

Gen. Ch. *Cal.* Perianth three-leaved, ringent; its two side-leaves sessile, nearly opposite to the lip. *Cor.* Petals two, much like the calyx, ascending. Nectary a lip proceeding from the lower part of the style, oblong, obtuse, spreading, callous at the base. *Stam.* Anther an hemispherical, moveable, terminal lid, of two cells, attached to the posterior edge of the top of the style, permanent, accompanied by a membranous auricle at each side; masses of pollen two in each cell, powdery, affixed by their base to the stigma. *Pist.* Germen inferior, obovate, erect, furrowed; style erect, funnel-shaped; stigma in front. *Peric.* Capsule of one cell. *Seeds* numerous, minute.

Ess. Ch. Calyx ringent, its side-leaves nearly opposite to the lip. Petals ascending. Lip without a spur, obtuse, callous at the base. Anther a lid, terminating the style behind. Pollen powdery.

Five species of this new genus were found by Mr. Brown in New Holland, chiefly in the colder parts, and a sixth is our *Epipactis unifolia*. (See EPIPACTIS.) The bulbs are undivided and naked. *Herbage* smooth. *Leaf* solitary, cylindrical, fistulous, embracing the stem with its long sheathing base. *Spike* of many small, greenish or white, flowers, the lip of some of which is undivided, in others two-lobed. The leaves of the calyx, as well as the petals, are more or less linear, the former frequently revolute. The lip differs greatly in form in the different species, and its margin is in some even and naked, in others wavy, warty, or tuberculated. The appearance of the whole is observed by Mr.

Brown to be very different from *Epipactis*, and most like another genus of his own, named *Praefophyllum*.

MICTUS CRUENTUS. See BLOODY URINE.

MID, or MIDDLE, in *Philosophy* and *Mathematics*. See MEAN and MEDIUM.

MIDA, in *Natural History*, the name of a worm or maggot, of which is produced the purple fly, found on bean-flowers, and thence called the bean-fly.

MIDAD ALHENDI, in the *Materia Medica of the Arabians*, a name given to the common indigo blue.

The express meaning of the words is India ink; but this is an erroneous name, founded on Pliny's misunderstanding the words of Dioscorides.

MIDAS, in *Fabulous History* and *Mythology*, was, according to Pausanias, the son of Gordius and Cybele, and reigned in the Greater Phrygia, as we learn from Strabo. According to the former of the two authors, he built the city of Ancyra, and that of Pessinus, upon mount Agdistis, famed for the tomb of Atys; but the latter merely says, that he and Gordius his father fixed their residence near the river Sangar, in cities, which in his time were mean villages: as he was rich, and a great economist, it was fabled that he turned into gold whatever he touched. It is suggested that this fable took its rise from his having been the first who discovered gold in the Pactolus. From his infancy it was foreseen, that he would be very rich and very frugal, because the ants, approaching his cradle, had put grains of corn into his mouth. However, his talent for accumulation did not extend to the acquirement of taste and knowledge in the fine arts; and, perhaps, his dulness and inattention to these, provoked some musical poet to invent the fable of his decision in favour of Pan against Apollo.

Pan, who thought he excelled in playing the flute, offered to prove that it was an instrument superior to the lyre of Apollo. The challenge was accepted, and Midas, who was appointed the umpire in this contest, deciding in favour of Pan, was rewarded by Apollo, according to the poets, with the ears of an ass, for his stupidity.

The scholiast upon Aristophanes, for explaining the fiction of the asses' ears, which Apollo had presented to Midas, says that it was designed to intimate that he had a very fine ear, like that animal, or because he kept spies through all his dominions, or because he commonly dwelt in a place named ωσα ωτες, the asses' ears. The fable reports, that his power of converting whatever he touched into gold was given him by Bacchus; but the present foon became injurious to him; for it is said, that whilst he was waiting for his dinner, the water in which he washed his hands, and also the bread, wine, and meat that were served up to him, were converted into gold, when he was ready to starve amidst all his riches: but applying to Bacchus, with a request that he would revoke the grant, Bacchus ordered him to wash his hands in the Pactolus, by which act he transferred the virtue which he possessed to the river, which, from that time, rolled a golden sand. This fable is thus explained. Midas, frugal to avarice, reigned over a very rich country, and made considerable sums by the sale of his corn, wine, and cattle. His avarice afterwards changed its object, and having learned that the Pactolus furnished gold dust, he abandoned the care of the country, and employed his subjects in gathering the gold of that river, which brought him a new and ample supply. On account of his attention to religion among the Lydians, he was reckoned, according to Justin, a second Numa.

MIDAS'S Ear-shell, in *Conchology*. See TRUMPET-FISH.

MIDDATOOR, in *Geography*, a town of Hindoostan, in Golconda; 15 miles S.E. of Canoul.

MIDDEL-

MIDDELBURG, a sea port town of Holland, in the state of Zealand, situated in the centre of Walcheren, of which it is the capital. The town-house is a magnificent building, and the fortifications are strong and regular, with eight gates, and twelve bastions for defending the walls and ramparts, besides large and deep ditches filled with water; and such also is its situation, that the inhabitants may lay the country under water whenever they please. The number of inhabitants has been estimated at about 26,000. N. lat. $51^{\circ} 34'$. E. long. $3^{\circ} 29'$.

MIDDING, in *Agriculture*, a provincial term applied to a dunghill.

MIDDLE BANK, in *Geography*, one of the fishing banks of Newfoundland; S.E. of Cape Breton. N. lat. 45° . See **FISHERY**.

MIDDLE Cape, lies to the south-west of cape Anthony, in Staten Land, on the strait Le Maire, and the most westerly point of that island; at the extremity of South America.

MIDDLE Island, a small island in the straits of Salayer, near the south coast of Celebes. S. lat. $5^{\circ} 40'$. E. long. $120^{\circ} 52'$.—Also, a small island in the East Indian sea, near the south-west coast of Boulton. S. lat. $5^{\circ} 38'$. E. long. $123^{\circ} 50'$.—Also, an island in the straits of Sunda, in the Indian sea. N. lat. $5^{\circ} 57'$. E. long. $104^{\circ} 53'$.—Also, a small island in Upper Canada, east of the Bals islands, and north of Ship island and Cunningham's island, in lake Erie.

MIDDLE Islands, a cluster of small islands in lake Huron. N. lat. $45^{\circ} 1'$. W. long. $83^{\circ} 33'$.—Also, a cluster of small islands in the Pacific ocean, near the coast of Mexico. N. lat. $9^{\circ} 30'$.

MIDDLE Island Creek, a river of Virginia, which runs into the Ohio, N. lat. $39^{\circ} 16'$. W. long. $81^{\circ} 22'$.

MIDDLE Lake, a lake of Canada; 300 miles N. of Quebec. N. lat. $51^{\circ} 44'$. W. long. $69^{\circ} 35'$.

MIDDLE Latitude, in *Navigation*, is half the sum of two given latitudes.

MIDDLE Latitude sailing, is used for a method of working the several cases in sailing, nearly agreeing with Mercator's way, but without the help of meridional parts. See **SAILING**.

MIDDLE Point, in *Geography*, a cape on the east coast of Labrador. N. lat. 59° . W. long. 63° .

MIDDLE Region. See **REGION**.

MIDDLE Sister, in *Geography*, a small island at the west end of lake Erie, in Upper Canada, situated between the East and West Sister.

MIDDLE States, one of the grand divisions of the United States of America, comprehending New York, New Jersey, Pennsylvania, Delaware, Ohio, and Indiana.

MIDDLE Tint, in *Painting*. See **HALF-TEINT**.

MIDDLE Voice, in the *Greek Language*, holds an intermediate rank between the Active and the Passive, being supposed to have a middle signification between them. Its tenses are formed partly on the model of the Active, and partly on that of the Passive tenses. The tenses peculiar to the middle voice are the two futures, the two aorists, the perfect, and the pluperfect. The two futures and the two aorists borrow the terminations of the Passive, while the two perfect tenses borrow those of the Active voice. For the manner in which these tenses are formed, we refer to the valuable Grammar of the Greek Tongue, on a new and improved plan, by Mr. John Jones. This excellent grammarian also observes, that as the middle voice derives its origin and explanation from the Passive, it is frequently used, like a Passive verb, in a sense purely active, and has after it an accusative noun; and this usage abounds in all writers of

prose as well as poetry. It is further observed, than when an accusative noun is not annexed, the personal pronoun, combined with the verb in the oblique case, is the object of the verb. Hence it is that the middle verb expresses a reciprocal or reflex sense. Our author infers from this statement, that the middle verb is in the strictest sense an Active verb; but whether or not it conveys a reflex signification, depends on the circumstance whether an accusative noun be annexed or not. The presence of a noun in the accusative, causes, as it were, the combined pronoun to disappear, and the verb becomes purely active; while its absence gives room for the objective pronoun to display itself, which consequently assigns to the verb the character of "reflex." Although the middle verb contains an objective pronoun in itself, yet it is sometimes distinctly annexed, in order to render the meaning more emphatic or prominent. Sometimes a noun equivalent to the reflex pronoun is annexed to a middle verb. For the illustration of these remarks by apposite examples, we refer to the author himself, *ubi supra*.

MIDDLE Wale, in a *Ship*, two or three thick strakes wrought fore and aft, between the lower and middle decks, in three-deck ships.

MIDDLEBOROUGH, in *Geography*, the Namasket of the ancient Indians, a post-town in Plymouth county, Massachusetts, incorporated in 1660, and containing 4458 inhabitants; 40 miles S. by E. of Bolton. This town is remarkable for a large range of ponds, which produce several sorts of fish, and large quantities of iron ore.

MIDDLEBOURG KEY, a small islet, separated from St. Martin's in the West Indies, on the north-east.

MIDDLEBROOK, a post-town of America, in Augusta county, Virginia; 186 miles from Washington.

MIDDLEBURG, a post-town of America, in Lowden county, Virginia; 47 miles from Washington.—Also, a post-town of Nelson county, Kentucky; 603 miles from Washington.

MIDDLEBURG, a town of Flanders, which derived its name from an abbey called "Middleburg," to which it belonged. In this town the free exercise of the Roman Catholic religion is allowed; 7 miles N.E. of Bruges. N. lat. $51^{\circ} 16'$. E. long. $3^{\circ} 15'$.

MIDDLEBURG. See **EA-00-WEE**.

MIDDLEBURG, New, a town of Dutch Guiana, at the extremity of the colony.

MIDDLEBURG, a small island near the west coast of New Guinea. S. lat. $0^{\circ} 18'$. E. long. $132^{\circ} 32'$.—Also, a small island in the gulf of Manar, near the west coast of Ceylon; 18 miles N. of Manar.

MIDDLEBURY, a post-town of America, in Vermont, capital of Addison county. Here are a brewery on a large scale, three grist mills, four saw mills, a forge, a gun and card manufactory, gaol, court-house, college, and about 400 dwelling-houses. The township lies on the east side of Otter creek, and contains 1263 inhabitants; 511 miles N.E. of Washington.

MIDDLEFAHRT, a town of Denmark, on the west coast of the island of Funen, in the Little Belt, which is here scarcely one mile wide, and called "Middlefahrt sound." Here is a ferry to Snogboy in Jutland; 34 miles W. of Odensee. N. lat. $55^{\circ} 32'$. E. long. $9^{\circ} 39'$.

MIDDLEFIELD, a township of America, in Hampshire county, Massachusetts; 30 miles N.W. of Springfield; incorporated in 1783, and containing 817 inhabitants.—Also, a thriving town in Trumbul county, state of Ohio; 15 miles N. of Warren.

MIDDLEHAM, a small market-town and parish in the

wapentake of Hang-West, in the North Riding of the county of York, England, is situated on the southern bank of the river Ure, 10 miles from Richmond, 44 from York, and 220 from London. Leland says, "The town is set on a hille side. The greates hill above hit more then a mile of hit is cawllid Penhil, and is countid the hiest hille of Riche-montshire. Middleham castle joynith harde to the town side, and is the fairest castel of Riche-montshire next Bolton, and the castel hathe a parke by hit caullid Sonstene, and another cawllid Westparke, and the third cawllid Gauncleffe, half a mile of. Westparke and Gauncleffe be well woddid. There is at the est ende of Middleham a little hospital, with a chapel of Jesus." The parish church is a handsome structure. In the year 1476, Richard duke of Gloucester (afterwards king Richard III.) obtained a licence from his brother, Edward IV., to make it collegiate, with provision for a dean, six chaplains, four clerks, and six choristers; but the establishment was never completed. The minister of the parish hath yet the title of dean of Middleham, and enjoys several privileges; but there probably never were any chaplains, clerks, or choristers. The castle, now in ruins, was the birth-place of king Richard III.; and in it Edward IV. was confined, after having been taken prisoner in his camp by Nevill, earl of Warwick. Middleham contained, according to the return in the year 1801, under the population act, 154 houses, and 728 inhabitants, of whom a considerable number are employed in the woollen manufacture. A weekly market is held on Monday, and here are three annual fairs.

MIDDLE-HORNED, in *Agriculture*, a term applied to a useful breed of neat cattle. This breed, which are often employed in team labour, is distinguished by different characteristic marks in the different varieties; which, in the Devonshire sort, is by a high red colour without white spots, by a light dun ring round the eye, by the muzzle having the same colour, by being fine in the bone and clean in the neck, by the medium length of the horns, and their being turned upwards, by being thin-faced, fine in the chops, wide in the hips, with a tolerable barrel, rather flat on the sides, by the tail being small and set on high, by being thin-skinned and silky in handling, and by the property of fattening at an early age, or arriving quickly at maturity. They are admirably fitted for the purpose of draught in hardiness, quick movement, and the form of the shoulder.

The principal varieties of this breed are the Devonshire, the Suffex, and the Herefordshire; all of which are highly useful sorts, and differ in some slight particulars from each other, as is seen under the head *Cattle*, where a full description of each kind is given. See **CATTLE**.

MIDDLESEX, *Earl of*, in *Biography*. This nobleman is often mentioned in opera annals, from the year 1741, when Handel retired from the Haymarket theatre as manager, or *impresario*; his lordship having taken upon himself that perilous and troublesome office, persevered in his love of dramatic music, and of rule, to his great loss, till 1748. See *OPERA History in England*.

MIDDLESEX, in *Geography*, an inland county of England, is bounded on the north by Hertfordshire, on the south by the river Thames, which divides it from Surrey, on the west by the river Colne, which separates it from Buckinghamshire, and on the east by the river Lea, which divides it from Essex. Its shape is extremely irregular, but, on the whole, approaches to that of the quadrangle. The greatest extent of the shire, from east to west, measures about 20 miles; and its greatest breadth, from north to south, about 17 miles. The superficial area of the whole county is

estimated by Mr. Middleton, in his *Agricultural Survey*, at 280 square miles, or 179,200 acres. Some other writers, however, state its contents at 218,000 acres. According to the parliamentary returns of 1801, it contained 118,083 houses, inhabited by 818,129 persons, viz. 373,655 males, and 444,474 females, of whom 162,260 were stated to be employed in different branches of trade and manufactures, and in agriculture.

This county, before the Roman invasion, formed part of the territories of the Trinobantes, or Trinovantes, a tribe of Britons, who are supposed to have derived their name from the peculiar nature of the country they occupied; being a broad valley on the banks of a wide spreading river. This tribe possessed two considerable cities, or fortified places; of which the eminence between the Thames and Moorfields, nearly the centre of modern London, was the seat of one; the other, and most important at that early period, was Camalodunum, now Colchester in Essex. Being torn by internal dissensions, the Trinobantes were the first who found themselves compelled to submit to the Roman arms. After the complete subjugation of the island, their territories, and consequently Middlesex, were included in the division called Flavia Cæsariensis; and Londinum or Augusta, now London, became a principal Roman station, though, from some cause unknown, it never was dignified with the name of a colony. See an interesting account of the Roman station and antiquities of London, by J. Moser, esq., in *European Magazine* for September 1812.

After the retreat of those illustrious conquerors, and the establishment of the Saxon heptarchy, this county appears for some time to have constituted a kingdom of itself; for which, however, its kings were obliged to do homage to those of Kent or Mercia. It was ultimately incorporated with the kingdom of the East Saxons, and remained in that condition till the dissolution of their monarchy, by the subjugation of the several kingdoms of the heptarchy to one monarch. Subsequent to this event, the history of London is intimately connected with the history of Middlesex. See *Turner's History of the Anglo-Saxons*, 2 vols. 4to.

The surface of this county, though mostly flat, presents a variety of hills, near its union with Hertfordshire, many of which rise almost imperceptibly to their summits, and are, on that account, admirably adapted for the purposes of agriculture; being sufficiently sloping to secure a proper drainage, and, at the same time, free from abrupt elevations. This inequality of surface, moreover, contributes in no small degree to health, ornament, and beauty; though only a few spots can be considered as eminently picturesque. The ground, for the most part, ascends from the banks of the Thames towards the north; and, within four miles of London, appears a range of gentle eminences, which shelters the metropolis from the northern blasts, and agreeably breaks the uniformity of the horizon. Of these heights the chief are Hampstead, Highgate, and Muswell Hill; all of which afford many pleasing and extensive prospects. So likewise does Harrow Hill, which, from rising in a sort of isolated manner, forms a prominent object for many miles around. This eminence approaches a higher and more extensive ridge, stretching north-eastward in interrupted swells from Pinner, Stanmore, Eltham, Totteridge, and Barnet, to the forest scenery of Enfield Chase. The average elevation of these hills is about 400 feet above the stream of the Thames. Such land as lies contiguous to that river, and to the Colne and Lea, is in general perfectly level, and exhibits a state of the highest cultivation.

The mineralogy of this county affords fewer objects of interest than perhaps any other in England. According to

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Mr. Middleton, the disposition of the strata is, "first, cultivated surface; secondly, siliceous gravel, from five to ten feet in thickness; thirdly, a strong leaden coloured earth, generally called clay, varying from one to three hundred feet in thickness; fourthly, marine sediment, sometimes cockle shells, but principally oysters, agglutinated together, and hardened into a sort of stony stratum, three, four, or five feet deep; fifthly, loose sand and gravel, from which the water is found to rise in such quantity, as to preclude the possibility of digging further. No metallic strata have yet been discovered in any part of the county; and appearances indicate, that if there really are any such, they lie at too great a depth to be made subject to the operations of the miner." A thin stratum of fullers' earth, however, was found, in 1802, about a mile from Paddington, on the Edgeware road; and in 1798, a quantity of loose coal, twelve inches in thickness, was discovered at Chelsea, nearly fifty feet from the surface. Fossil shells, principally bivalves, together with other marine exuviae, have occurred in different parts.

The soils in Middlesex are various, but loam and clay, or sand and gravel, more or less intermixed with loamy clay, are the most prevalent. The latter sort of surface predominates on the summits of most of the hills. Hampstead Hill consists chiefly of yellow iron-stained sand, with some loam and rounded flints placed on a pure white sand, many feet in depth. A loamy sand is the prevailing soil in that district of the county which forms its south-westernmost angle, and lies between the river Thames, and the road stretching from Hounslow to Colnbrook. From Tottenham to Enfield Wash the superstratum is of a similar description, and rests upon the same under strata. Westward from Hanwell and Hounslow, the loam existing in much greater quantity than the sand, agriculturists distinguish the soil here by the appellation of a sandy loam. The same soil is found in the parishes of Twickenham, Isleworth, Ealing, Chiswick, Kennington, Fulham, Brompton, and Chelsea, as likewise in the south division of the parish of Harefield. All the land from Ruisslip and Ickenham on the west, to Gneeford, Apperton, and Harrow on the east, and between Pinner on the north, and Northcote on the south, is composed of strong loam; the land about Mims is of the same kind, and the level between Islington, Hampstead, and Hornsey, is a strong but very unproductive loam. The loamy clay predominates on the north side of a hill between Uxbridge Common and Harefield, to the north-west of Ruisslip, and between the river Brent and Hampstead on the Hendon road. From Nightingale Hall by Colney Hatch to Whetstone, the soil is a loamy clay mixed with pebbles of flint, and also from Potters'-Bar for about two miles towards South Mims. The north side of Highwood Hill has a thin layer of loamy clay on a subsoil of yellow clay, every where abounding with rounded flints. In the Isle of Dogs, and in all the lands on the flat borders of the rivers Lea and Colne, together with some spots immediately adjacent to the Brent and the Thames, the soil is of that peculiarly rich kind which is formed by the collection of the various substances that may be washed down by the rivers from the high grounds, villages, towns, and cities. The moors extending from Rickmansworth to Staines consist chiefly of peat on a subsoil of siliceous gravel, which in various parts shews itself at the surface. Some peat has likewise been found in the Isle of Dogs.

Middlesex, from its situation with regard to London, presents more variety in its agriculture than any county in Great Britain. To give the reader, therefore, a proper idea of this subject, it will be necessary to enter at greater length

into detail than might otherwise be requisite. In general, however, it may be premised that the eastern division of the county, with the exception of the gardens in the vicinity of the metropolis, are appropriated to meadow, pasture, and potatoe-grounds; and that the western division, excepting Hounslow Heath, Sunbury, and Ruisslip commons, and some other spots, consists chiefly of arable lands.

The greater part of the upland, meadow, and pasture-grounds in this county has, no doubt, been at one time under cultivation, as they still exhibit unequivocal marks of the plough. These grounds are kept in the highest state of order, and are plentifully furnished with manure, so that they afford the most luxuriant crops. The manner and period of applying the manure are studied by the farmers with great attention. They observe, says Mr. Middleton, the state of the atmosphere, and should it indicate rain after the hay is removed from the ground, they put the dung of neat cattle upon it. Should the barometer, however, not promise rain in considerable quantities, the decomposed manure is allowed to remain on the dunghills till the end of September, at which time it is put on while the ground is dry enough to bear the loaded carts without injury. Meadow land in the occupation of cow-keepers is usually mown two or three times during summer, the great number of cows kept by them enabling them to dress it every year. As their chief object is to obtain their hay of a soft grassy nature, they cut it young, conceiving it to be better provender for milk cows in that state than after the feeding stems have risen.

The pasturage or grass-lands lie principally, if not entirely, on the banks of the several rivers with which this county is supplied. Those adjoining to the river Lea contain about 2000 acres, of which upwards of 1200 are inclosed, and the remainder divided by land-marks among a great number of proprietors. The several tracts of grass-lands on the banks of the Colne include about 2500 acres, and such of them as are inclosed are extremely fertile. By far the greater proportion of them, however, are Lammas Meads; and one of the necessary consequences of this condition is, that the ditches are so much neglected as to be grown up. The richest grass-land in the whole county is that of the Isle of Dogs, which, since the formation of the East India Docks, has been reduced from 1000 to less than 500 acres.

Before concluding the subject of meadow and grass-lands, it may not be improper to notice shortly the method of hay-making practised in this county, the decided superiority of the farmers in that art being acknowledged by all who have any pretensions to agricultural skill. Here it is reduced to a regular system, unknown in other parts of the kingdom. When the grass is about to be mown, the farmer engages a certain number of persons for that work, according to the extent of his lands. At the same time he provides five haymakers to each mower, who are paid by the day. On the first day all the grass mown before nine o'clock is tedded, in which operation great care is taken to shake it out well, and strew it evenly over the ground. After this, it is turned once or twice with similar care; and in the course of the afternoon is raked into what are called single wind rows, and towards the evening is put into grass cocks. On the second day the business commences by tedding all the grass mown on the first day after nine o'clock, and all that has been mown this day before nine o'clock. Next the grass cocks are well shaken out into separate plats, called saddles, of five or six yards diameter. The saddles are next turned, and after that is done, the grass tedded in the morning is turned once or twice in the same manner as described for the first day. After dinner the saddles

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are formed into double wind rows; the grafs is next raked into fingle wind rows; then the double wind rows are put into baltard cocks; and laftly, the fingle wind rows are put into grafs cocks. On the third day the grafs mown and not fpread on the fecond day, and alfo that mown in the early part of this day, is firft tedded in the morning, and the grafs cocks are fpread into ftaddles, as before, and the baltard cocks into ftaddles of lefs extent. Thefe leffer ftaddles, though laft fpread, are firft turned, then thofe that were in the grafs cocks, and laftly, the grafs, once or twice; after which, the people go to dinner. Should the weather prove fine, the hay which was in baltard cocks the preceding night, will, this afternoon, be in a proper ftate to be carried, but not fo if the weather has been cloudy and cool. In the latter cafe, the firft operation after dinner is to rake the grafs cocks of the laft night into double wind rows, and the grafs which was this morning fpread from the fwaths into fingle wind rows. Afterwards, the baltard cocks of the laft night are made up into full fized cocks, and care taken to rake the hay up clean, and alfo to put the rakings upon the top of each cock. Next, the double wind rows are put into baltard cocks, and the fingle wind rows into grafs cocks, as on the preceding days. On the fourth day the great cocks are ufually carried before dinner. The other operations of the day are conducted in the fame routine as on thofe already defcribed, and fo on daily till the harvelt is finifhed.

The fruit gardens of Middlefex, folety intended for the fupply of the public market, are fuppofed to occupy about 3000 acres. They extend, principally, on each fide of the high road, from Kenfington through the parifhes of Hammerfmith, Brentworth, Illeworth, and Twickenham. Thefe gardens, on an average, furnifh conftant employment to about ten perfons *per* acre, men, women, and children; but during the fruit feafon, this number is increafed from thirty-five to forty. The annual produce of the labour of thefe individuals collectively is eftimated at 300,000*l.*, about three-fourths of the whole fupply of London. In thefe gardens it is ufual to have two crops, one called an *upper*, and the other an *under* crop. The former confifts of the larger fpecies of fruits, and the latter of the fmaller, fuch as rafpberries, goofeberrys, currants, and others which are known to fuffer little injury by exclusion from the influence of the fun. Some gardens are inclofed by very high walls, againft which grow a vaft variety of wall fruits; and artificial banks are alfo frequently formed, by means of which the gardeners are enabled to raife certain crops many weeks earlier than they could otherwife effect.

The nurfery gardens lie moftly in the neighbourhoods of Chelfea, Brompton, Kenfington, Hackney, Dalton, Bow, and Mile-End, and are computed to comprife upwards of 1500 acres. In thefe gardens are to be found almoft every variety of fruit trees, ornamental fhubs, and rare plants, known in any quarter of the world. Indeed, fo celebrated are the nurfery-men of Middlefex for the cultivation of exotics, that, in times of peace, a great exportation of thefe articles takes place to France, Spain, Portugal, Italy, Ruffia, and other countries.

The extent of ground fituated in Middlefex appropriated to kitchen gardens for the fupply of the London markets, is eftimated at nearly 3000 acres, or about one-fourth of the whole lands fo employed in the neighbourhood of the metropolis. About a tenth part of thefe gardens is entirely prepared by the fpade, and the remainder partly by the fpade, and partly by the plough. The average produce of thefe gardens, which are kept in a ftate of high fertility by an abundant fupply of manure, is fuppofed to amount to

200*l.* *per* acre annually, the profit upon which may be about 120*l.* Willows for the ufe of the bafket-makers are much cultivated in the iflands and on the banks of the Thames, particularly in the vicinity of Brentford, Twickenham, and Sunbury. The profits arifing from this fpecies of cultivation are faid to be immense, but they are carefully concealed from public scrutiny.

Farms in this county, from the manifold divifion of its landed property, are ufually of fmall extent. The rents vary extremely, according to local and other circumftances, being in fome places averaged fo low as ten fhillings, and in others at above twelve pounds. They are, without exception, paid in money, with the addition, in fome few inftances, of fupplying the landlord's family in town with fresh butter at 8*d.* or 9*d.* *per* pound, of 16 ounces to the pound, and with cream at 6*d.* *per* pint. Tithes, from which only a very few farms are free, are chiefly taken in kind, though in fome cafes an annual compofition is preferred. The wages of labourers in husbandry here in winter vary from ten to twelve fhillings *per* week, and in fummer from twelve to fifteen. Thofe employed only in hay-time and harvelt have from fifteen to eighteen fhillings, with beer occasionally, and fometimes a dinner. A great part of the agricultural bufinefs, however, is done by the piece, the prices varying according to the feafon. Farm-houfes, built within the laft hundred years, are moftly conftituted of brick, and well adapted for the accommodation of a refpectable family. The offices erected within the fame period are likewise laid out upon a good plan. If of older date, however, than the 18th century, both houfes and offices are of wood, lathed and plaifttered, with the roofs thatched; and from the many repairs, additions, and alterations they have undergone, have the appearance of being built by piece-meal, to fuit the immediate wants of the farmers, who may properly be divided into various claffes or defcriptions of perfons. Thofe who rent land in the immediate neighbourhood of the metropolis are chiefly cow-keepers, gardeners, and nurfery-men. The lands lying immediately behind their's are occupied by the villas of wealthy citizens and others; and thefe are fucceeded by farmers, who may be again divided, firft, into perfons with whom farming is but a fecondary occupation; and, fecondly, fuch as, having acquired an eafy fortune by other purfuits, retire to farming, with the idea of uniting profit and amufement in their agricultural labours. The third clafs is lefs numerous than either of the former, and confifts likewise of perfons who have abandoned fome former purfuit entirely, and directed their attention excluifively to farming as a profefion: this clafs forms the moft intelligent and moft accurate of husbandmen. The fourth and laft clafs is equal in number nearly to all the other claffes conjoined, and is compofed of perfons who have been originally bred to farming, and have continued to employ themfelves in the fame occupation.

The arable lands in Middlefex are chiefly fpread out in common fields, not above one-fourth of the whole being inclofed. This department of husbandry is much lefs underftood than thofe divifions of it already noticed. Ploughing is, for the moft part, conducted upon an injurious and expenfive plan. The ploughs, as well as the carts, are much too clumsy, requiring an unneceffary number of cattle to drag them. Fallowing is feldom praftifed, becaufe the farmers regard the introduction of green crops, at certain intervals in the rotation of crops, as rendering this mode of recruiting the ground altogether unneceffary; and it muft be confeffed, the idea derives fome confirmation from experience, for in the parifh of Helton, where the belt wheat in the county is grown, that praftice is wholly excluded. The

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corn chiefly raised here is wheat and barley, rye and oats being cultivated only in very small quantities. The whole extent of land cropped with wheat in Middlesex is about 10,000 acres, and new grain recently threshed is mostly preferred for seed. About 4000 acres are laid down in barley; 3000 acres are appropriated to beans; and nearly the same amount to peas. The remainder of the arable lands is occupied by a variety of other green crops, as turnips, cabbages, white and red clover, ray-grass, (usually cut green,) and tares for the food of cattle; together with turnips, potatoes, carrots, parsnips, &c. for the use of man. Liquorice and hops are likewise among the saleable commodities cultivated in a few fields in the vicinity of London.

The number of live stock kept in this county is smaller, even in proportion to its extent, than in any other in England, with the exception of the cows appropriated for the supply of London with milk. These cows, which are of a large size, are commonly distinguished by the appellation of the Holdernefs breed, from a district of that name in Yorkshire; but they have long since ceased to be confined to that particular kind. The total number kept in Middlesex, for the purpose above-mentioned, is stated by Mr. Foot, in his Agricultural Report, at 7200. The mode of treating these cattle is as follows. During the night they are confined to their stalls, and about three o'clock in the morning each is provided with half a bushel of grains. From four to half past six they are milked by the retail dealers, and as soon as that operation is finished, each cow receives a bushel of turnips, and not long afterwards a small portion of soft meadow hay. These several feedings are commonly finished by eight o'clock in the morning, when the cattle are turned into the cow-yard. At twelve, they are again confined to their stalls, and are served with the same quantity of grains which they had in the morning. The milking recommences about half past one, after which follows again the turnips and hay. This mode of feeding continues from the month of September to May. During the other months they are fed with grains, cabbages, tares, and second cut grass, except when the weather is peculiarly fine, and then they are turned out to graze; but even in this case they still receive a portion of grains. One bull is the usual proportion to a flock of thirty cows. The net profit of the cow-keeper, upon every cow, is estimated at 6*l.* annually. Calves are generally disposed of at one, two, or three days old. Many, however, are likewise suckled for eight or ten weeks, when they become fat, and are thought to furnish the best veal.

The Middlesex sheep are not of any particular breed, the farmers either directly or indirectly purchasing their stock from almost every county in England. Such ewes, however, as are kept for the supply of the London markets with house-lambs, are all of the Dorsetshire breed. This last branch of farming is, perhaps, the most profitable of any in the county. Early-lambing ewes, of which those of a large size with white noses are preferred, are sought for with great diligence, the prices varying from forty to fifty shillings. Early grass-lambs are likewise an object of importance with the farmers of Middlesex; and for supplying these, the Dorset ewes are chiefly selected, but the South-down breed is occasionally preferred. The feed both of the ewes and lambs is principally turnips and second crop hay. The lambs are usually sold fat in the months of April, May, and June, at from thirty shillings to two guineas each.

The number of horses kept in this county amounts to between thirty and forty thousand, but very few of them are bred in it. Such as are employed in agricultural opera-

tions, as well as those used by the brewers, distillers, and carmen of London, are mostly bred in Leicestershire and the adjoining counties. The coach and saddle-horses are principally brought from Yorkshire. No horses can surpass the draught horses of the brewers, coal-masters, &c. in strength and figure. Hogs are kept in considerable numbers, but chiefly by the malt-distillers, for whom they are purchased lean at a large market held on Finchley Common, to which there are vast numbers brought from Shropshire and other distant counties. The fattened hogs are bought for the hog-butcheries about London; and the bacon cured here is reckoned very little inferior to that of Wiltshire and Yorkshire. A great supply of poultry is reared in Middlesex, chiefly, however, for home consumption. Many pigeons and rabbits are also bred, particularly in the neighbourhood of London, by the poor people and journey-men tradesmen. The only regular warren in the county is that on Uxbridge Common; so that a great proportion of the rabbits sold by the poulterers in London are of the house-breed.

Middlesex, considering the proximity of every part of it to the British metropolis, cannot boast of such good roads as might be expected. For, notwithstanding the immense sums raised to keep them in repair and proper condition, it is a fact, that even the great roads which branch off immediately from the city, as from a centre, are frequently suffered to remain in the most neglected state, especially during the winter months. This arises, in a great measure, from the inappropriate means employed in cleaning them, and from the inadequacy of the materials employed in their construction and repair, to sustain the continued pressure of the immense loads which are constantly drawn along them. It must be confessed, however, that many improvements in this respect have been made within these few years, and that even as they are, they would be accounted excellent in every other part of Europe, except in the neighbourhood of London. The parish highways, as they are denominated, are usually kept in excellent order; but the same remark cannot be applied without considerable limitation to the streets of London, which, in the carriage-ways, are usually paved with Scotch granite. The canals which intersect Middlesex are the Grand Junction canal, and the Paddington canal. The former, striking off from the Thames at Old Brentford, passes the grounds at Sion Hill and Osterley, and running through a rich corn district near Hanwell, Norwood, Harlington, West-Drayton, Cowley, Uxbridge, and Harefield, leaves this county near Rickmanworth. This canal, which is navigable for vessels of sixty or seventy tons burthen, has fourteen locks to Harefield Moor, where the level is 114 feet two inches above that of the river Thames. From its numerous cuts, side branches, and collateral streams, it is, beyond doubt, the most important inland navigation in the kingdom, as it affords a direct water communication to all the various manufacturing towns of Warwickshire, Staffordshire, Lancashire, Derbyshire, and several other counties. The general breadth of this canal is thirty feet, but at the bridges it is contracted to fifteen. The Paddington canal branches off from it near Cranford, and is continued on a level from thence to the dock at Paddington, the sides of which are occupied with yards and warehouses, for the reception and security of merchandise. The advantages derived to the metropolis and the country at large from this canal, are likewise various and important. A third canal, called the Regent's Canal, stretching from the Thames, west of London, to join that river near Limehouse, has been lately projected, and is now carrying into execution. Though there are no streams of any consequence which take their rise in this county, several considerable

derable ones water it in different directions. Of these, the most important, not only in Middlesex, but in England, is the Thames, which serves as the boundary between this county and Surrey, as already mentioned. See THAMES.

The other principal rivers of Middlesex are the Colne, the Brent, and the Lea; all of which discharge their waters into the Thames. The Lea, which joins it at Bow Creek, is navigable as high as Ware and Hertford. All of these waters are covered at different points with mills, and other machinery, employed in the various departments of manufactures and the arts. Besides these streams there are several others, which, though of trivial size, have some claims to attention. Fleet Brook, which is now enclosed from the view in its passage through London, was formerly navigable for barges. It takes its rise among the high grounds at Hampstead Heath and Caen Wood, from whence it proceeds by Kentish Town, Pancras, Bagnigge Wells, Mount Pleasant, and Saffron-hill, crossing Chick-lane, and running under Fleet-market and Bridge-street, where it enters the Thames. The New River is an artificial stream, formed by the collected waters of several small springs issuing from the vicinity of Chad-well, in Hertfordshire. (See NEW RIVER.) Several mineral springs rise in the immediate vicinity of London; and some of them were formerly of much repute, though they are now but seldom used. The Spa fields, north of London, derive their name from the number of chalybeate springs that rise within them, of which that at Islington Spa, called also New Tunbridge Wells, is the principal. At Bagnigge Wells are springs both chalybeate and cathartic. The other springs of note are St. Chad's Wells, near the bottom of Gray's-inn-lane road, Kilburn Wells, Acton Wells, and several more situated at Hampstead, and in the parishes of St. Pancras and Shadwell.

Middlesex, as containing London, is the principal seat of commerce and manufactures in Great Britain. While its traders visit the most distant parts of the known world, its artificers at home produce almost every variety of articles which any district in the country can furnish. The chief portion of these, as may be presumed, is manufactured in London and its suburbs: but many important manufactories are likewise spread over the county; most of them, however, the property of individuals established in the town.

The maintenance of the poor in this county is too important a branch of its civil economy to be passed over unnoticed, even in a general account like the present. According to the returns made to parliament on this subject, in the year 1804, the number of persons maintained in work-houses, from the 20th of April 1802 to the 12th of April 1803, was 15,186; and the number of those relieved out of work-houses, 47,987. The total annual expence, incurred in supporting the former, was 224,048*l.* 2*s.* 1½*d.*; and the expence of relieving the latter, 121,901*l.* 12*s.* 3*d.*; making in all, the sum of 364,034*l.* 14*s.* 10½*d.*, or 5*l.* 15*s.* 3*d.* for each parishioner. Besides these, however, there were 32,506 persons, not parishioners, who had received occasional relief, to the amount of 3250*l.* 12*s.*: so that the whole sum expended for the benefit of the poor, during that year, was 367,284*l.* 12*s.* 10½*d.* The amount of the rates, for the same period, was 490,144*l.* 1*s.* 7½*d.*; an average of 10*s.* 10½*d.* per head on the whole resident population, then computed, as has been seen, at 818,129 persons. Eight persons in the hundred, according to this calculation, were relieved by the poor's rate. Independent of these parochial burthens, there were then 1132 friendly societies, of which 54 were stated to be female societies, and 750 to have been enrolled at the quarter-sessions, pursuant to the acts passed in the 33d and 35th years of his present majesty. The

total number of persons belonging to these societies is stated at 72,741, (of whom 3754 were females,) being nine in a hundred of the resident population.

The Romans seem to have had only two stations in this county: Londinum or Augusta, now London; and Sullonica or Brockley hills, near Elstree, on the borders of Hertfordshire. Roman remains, however, have been discovered at many other places. The Roman roads appear to have concentrated in London, and to have branched off from that city in different directions, as from a common centre. The Watling-street, running from Dover, is presumed to have entered Southwark at the point now called Dowgate, and, keeping along the present Watling-street, to have quitted the city at Aldersgate. After this, its precise direction cannot be easily determined; but it probably turned westward at the end of Old-street, and continuing along Wilderneys-row and Clerkenwell, crossed the Fleet Brook, and ascended the hill at Portpool-lane; thence pursuing a north-westerly direction, it fell into the tract which now forms the high road to St. Alban's, and approaching the station of Sullonica, passed on through Elstree to Verulamium. The Ikenild-street, taking an easterly direction up Old-street, and over Bethnal Green, went on by Old Ford to Camaldunum or Colchester. The Ermin-street led northwards through Islington, Stoke Newington, and Hornsey, to Enfield: then turning off near that town, it passed Clay-hill, and entered Hertfordshire. A fourth Roman road led into Surrey and Berkshire, by the towns of Brentford, Hounslow, and Staines, along the course of the present turnpike; and there seems every reason to believe that a fifth took the direction of Essex, through Whitechapel and Stratford-le-Bow. Several camps of British and Roman construction are dispersed throughout the county, but none of them are peculiarly interesting: and in general it may be remarked, that, except in London and Westminster, there are few remains of antiquity in Middlesex, which have any claims to the particular notice of the antiquary.

Middlesex is divided into six hundreds, exclusive of the cities and liberties of London and Westminster, and the Tower Hamlets. The total number of parishes, places, precincts, and extra-parochial places, in the whole county, as returned under the population act, was 234. All of these, with the exception of the city and liberties of Westminster, which are governed by the dean and chapter of Westminster, are included in the diocese of London. It contains nine market-towns, distinct from the metropolis, namely, Barnet, Southall, Finchley, Uxbridge, Brentford, Hounslow, Edgware, Staines, and Enfield. Uxbridge market is principally for corn; and at Hounslow there is always a very considerable show of fat cattle, for the supply of the London butchers. Beauties of England and Wales, vol. x. by E. W. Brayley. Camden's Britannia, by Gough, fol. vol. ii. Stukeley's Itinerary, fol. Agricultural Survey of Middlesex, by Middleton, 8vo.

MIDDLESEX, a county of America, in Massachusetts, bounded north by the state of New Hampshire, east by Essex county, south by Suffolk, and west by Worcester county. It is nearly of a square form; its greatest length being 52, and its greatest breadth 42 miles. It has 42 townships, containing 46,928 inhabitants, and was made a county in the year 1643. It is watered by five principal rivers, viz. Merrimack, Charles, Concord, Nashua, and Mystick, besides some smaller streams. The chief towns are Charlestown, Cambridge, and Concord. The southern and northern sides of the county are hilly, but none of the hills exceed 100 feet in height; and they are either covered

with wood, or cultivated to the summit. The air is generally serene, and the temperature mild. The soil in some parts is rich black loam, but in others it is light and sandy. It produces the timber, grain, and fruit, which are common throughout the state, either by natural growth or cultivation.—Also, a maritime county of Connecticut, bounded north by Hartford county, south by Long Island Sound, east by New London county, and west by New Haven. It is divided into six townships, containing 13,873 inhabitants, of whom 72 are slaves. The chief town is Middletown.—Also, a county of New Jersey, bounded north by Essex, north-west and west by Somerset, south-west by Burlington, south-east by Monmouth, east by Raritan bay, and part of Staten island. It contains 17,890 inhabitants. From the mouth of Raritan river to Brunswick, the land on both sides is generally good, both for pasture and tillage, and produces considerable quantities of every kind of grain, and of hay. The chief town is New Brunswick.—Also, a county of Virginia, on the south side of Rappahannock river, on Chesapeake bay, about 35 miles long, and 7 broad, containing 1687 free inhabitants, and 2516 slaves. The chief town is Urbanna.

MIDDLESEX, one of the three counties into which the island of Jamaica is divided; the two others being Cornwall and Surry. This county is composed of eight parishes, one town, viz. St. Jago-de-la-Vega, or Spanish Town, the capital of the island, and thirteen villages.

MIDDLESEX, *Bill of, in Law.* See BILL.

MIDDLETON, Sir HUGH, in *Biography*, a public-spirited man, was the sixth son of Richard Middleton, esq. governor of Denbigh castle, in the reigns of Edward VI., Mary, and Elizabeth. The subject of this memoir settled in London, as a goldsmith; but in early life he had engaged in mining speculations in his own country, and worked a copper-mine in Cardiganshire, which brought him in a considerable income. During the reigns of Elizabeth and James I., the citizens of London obtained a power to bring a new supply of water to the city, from certain streams or springs in Middlesex or Hertfordshire. Various attempts were made; but they were all abandoned, on account of the difficulty and expences attached to so vast a concern. At length the city made over to Mr. Middleton, and his heirs, all the powers and rights conferred by an act of parliament; and he began the business in the year 1608. Two springs, one rising near Ware, and the other at Amwell, in Hertfordshire, were united for the supply of an artificial river, which was conducted to the metropolis. The expences of the undertaking were so great, that they exhausted the fortune of the projector, who, having in vain applied to the corporation of London for assistance, procured it from the king, to whom a half-share of the concern was made over, in consideration of his taking an equal share in the expences. This great work was completed in 1613; and on Michaelmas day, the water was let into the reservoir of Islington with great solemnity. Mr. Middleton was rewarded with the honour of knighthood; but his profits were so small, that he was under the necessity of engaging in the business of a surveyor, or what is now denominated a civil engineer, and in that capacity rendered essential services to his country, by various schemes of mining, draining, &c. In 1622 he was created a baronet, and he died in the year 1631; since which, the value of the shares in this New River, as it is still called, have advanced so much as to create large fortunes to the heirs of the original holders. A hundred pounds share, some years since, sold as high as fifteen thousand pounds. Of late, however, there have been several acts of parliament passed in favour of other

projects, which will be noticed under the article *Water-Works*, and which have reduced the value of the New River shares full one half. It is the fashion now to decry the company as extravagant in their charges for supplies of water; but it should be remembered, that the shares of this corporation, like those of other commercial companies, are perpetually changing their masters; and it is probable that the majority of share-holders, when their value was even at the highest, had paid their full price, so as to gain only a moderate interest upon their purchase money. *Biog. Brit.*

MIDDLETON, WILLIAM, a Welsh poet, was born at Gwernnog in Denbighshire, and died about 1600. He served in the armies of queen Elizabeth, and afterwards commanded a ship of war; and when at sea, turned the book of Psalms into Welsh verse. This work was finished in the West Indies, in 1595. He was also the author of a Grammar, and Art of Poetry, published in 1598.

MIDDLETON, CONYERS, a celebrated divine of the church of England, was born in the year 1683 at Richmond, in Yorkshire, where his father was minister. At the grammar-school of that town he was educated, and from a very early period he gave fair promise of future excellence. At the age of seventeen he was sent to Trinity-college, Cambridge; and in 1702 was chosen a scholar upon the foundation, and took his degree of B.A. In a short time afterwards he entered into deacon's orders, and officiated as curate to one of the senior fellows of his college, at Trumpington, a village near Cambridge. In 1706 he was elected fellow of his college, and in the following year he proceeded M.A. Soon after his election to the fellowship, he took an active part in the measures which were concerting in opposition to Dr. Bentley's imperious conduct, as master of the college; and he united in a petition to the bishop of Ely, which charged the doctor with many misdemeanors. For his zeal in this business he was considered by the doctor as his most determined and dangerous enemy. While this discussion was carrying on, Mr. Middleton married a lady of large fortune, and was obliged to vacate his fellowship; but he still resided at Cambridge, till he was inducted to a living in the Isle of Ely. To this he removed, but finding the situation unhealthy, he left it in about a year, and returned to Cambridge, where he was when George I. paid a visit to the university. On this occasion he got his name inserted, with those of several others, in the royal mandate for the degree of doctor of divinity, which he accordingly received from the hands of Dr. Bentley, the regius professor. Dr. Middleton on this occasion resisted the fees, for the ceremony called creation, which led to a controversy, that run out to a considerable extent, and which was carried on with great bitterness. The addition made to the public library at Cambridge, by a present from the king of bishop More's books, which had been purchased at the expence of six thousand pounds, induced the university to pass a decree for erecting a new senate-house, that a suitable place might be provided for the reception of his majesty's donation. This decree was accompanied with a vote for a new office in the university, viz. that of principal librarian, which was conferred upon Dr. Middleton. Such a promotion was no more than what was justly due to his literary merit. To shew how well qualified he was for that appointment, he published, in 1723, a little piece, entitled "*Bibliothecæ Cantabrigiensis ordinandæ Methodus quædam; quam Domino Procancelario Senatuique considerandam et perficiendam, Officii et Pietatis ergo proponit.*" Soon after the doctor had completed the arrangement in the new library, his health requiring a change of climate, he applied for leave of absence from the university; and having obtained a

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Special grace for that purpose, though not without difficulty, he set out for the continent, in company with lord Coleraine, a nobleman of considerable learning, who, upon their arrival at Paris, introduced him to the celebrated Montfaucon. Here Dr. Middleton separated from his lordship, and travelled by the direct route for Rome, where he arrived early in the year 1724. After residing in this city about twelve months, Dr. Middleton returned through France to England, and arrived at Cambridge in the latter end of the year 1725. Almost immediately after his return he published a tract, entitled "De Medicorum apud Romanos veteres degentium Conditione Dissertatio; qua contra Viros celeberrimos Jac. Sponium, et Ric. Meadium M.D.D. servilem atque ignobilem eam fuisse ostenditur." Dr. Mead had just before this published an oration, in which he had defended the dignity of the medical profession, and endeavoured to vindicate it from the reproach of its having been held in such low estimation by the ancient Romans, as to be left in the hands of slaves and the meanest of the people. In defence of the opinion of the learned physician, a work was published under the title of "Ad Viri Reverendi Con. Middletoni, S.T.P. de Medicorum apud Veteres Romanos degentium Conditione, &c. Dissertationem Responsio." This was published without any author's name, but it was soon found to be the production of professor Ward, who had been engaged by Dr. Mead to write it; and at his expense it was printed and published. Dr. Middleton replied in a very spirited defence both of his character and argument, entitled "Dissertationis de Medicorum Romæ, &c. Defensio." With this the doctor finished his part of the debate; and through the whole progress of it, he did not fail on every occasion to express a proper regard for Dr. Mead's real merit: and this literary altercation did not prevent them from living afterwards upon very good terms with each other. While our author was at Rome, he had the advantage of beholding popery in the full pomp and display of its pageantry, which he compared rather to the solemn acts of idolatry of old Rome, than to any thing recommended by the plain and simple precepts of Christianity. He examined it very accurately; and with the view of tracing the similarity, he made notes and observations while he was in Italy; and, after his return home, kept up an epistolary correspondence with his friends and acquaintance there. From these materials he drew up, and published in 1729, "A Letter from Rome, shewing an exact Conformity between Popery and Paganism; or, the Religion of the present Romans derived from that of their heathen Ancestors." This performance was exceedingly well received by the public, and went through several editions in a very short space of time. While, however, the author was entitling himself to the thanks of the Protestant world, by exposing the corruptions and impostures of the Romish church, there were some, even of the church of England, who took grievous offence at the book, pretending that he had attacked the Popish miracles with a gaiety that seemed to condemn all miracles, and particularly those of our Saviour, by invalidating the force of certain rules which had been established by some divines as the criterion of true miracles. Our author next made an attack upon Dr. Waterland's, "Vindication of the Scriptures, &c." which had been written in reply to Tindal's famous book, entitled "Christianity as old as the Creation." This drew upon Dr. Middleton the charge of infidelity, and he narrowly and with much difficulty escaped academical censure. During the contest in which he had involved himself on this subject, he was appointed to the new professorship of physiology at Cambridge, which had been founded in pursuance of the

will of Dr. Woodward. He delivered, in the year 1731, a Latin inaugural oration, at his entrance upon the office, that did credit to the appointment of Dr. Woodward's executors. The duties of this post Dr. Middleton discharged with fidelity and reputation, till the year 1734, when he resigned it. In the following year he published "A Dissertation concerning the Origin of Printing in England, shewing that it was introduced and practised by William Caxton, at Westminster, &c." About this time the doctor was introduced to the celebrated lord Harvey, by whose advice and encouragement he undertook to write "The History of the Life of M. Tullius Cicero." This great work, which was well adapted to his taste, and for which he was perfectly qualified, employed so much of his time and attention, that it was not ready for publication till the year 1741, when it appeared in two volumes, 4to. It was published by subscription, and the profits enabled him to purchase a small estate in the neighbourhood of Cambridge, at which he usually spent the summer season.

While Dr. Middleton was employed on the life of Cicero, a vacancy occurred in the mastership of the Charter-house; and he was mentioned for it by sir Robert Walpole, and came to London with the hope of obtaining it; but was disappointed in his expectations, and returned to the composition of his favourite work. In the progress of this work, he engaged with Mr. Tunstall in a controversy respecting the authenticity of Cicero's letters to Brutus, and of those of Brutus to Cicero. He also, about the same period, published "Germana quædam Antiquitatis eruditæ Monumenta, quibus Romanorum veterum Ritus varii tam facti, tam profani, tum Græcorum atque Ægyptiorum nonnulli illustrantur. Romæ olim maxima ex Parte collecta, ac Dissertationibus jam singulis instructa." This work, which consisted of the figures of those curious remains of antiquity that he had purchased at Rome, and other places, with a dissertation on each, was followed, in 1747, by "A Treatise on the Roman Senate, in two Parts," which terminated Dr. Middleton's labours in profane literature; and he now proceeded to the publication of a treatise, which laid the foundation of another fierce controversy with his clerical brethren. It was published in 1747, and was "An introductory Discourse on the miraculous Powers supposed to have subsisted in the Christian Church from the earliest Ages, &c." To this numerous answers were written, which, however, did not prevent him from proceeding with his plan; and in 1749 he produced the larger work, to which the former was, as it assumed to be, only an introduction. This was entitled "A free Inquiry into the miraculous Powers, &c." The main object of the *Inquiry* is to shew, that there is no sufficient reason to believe that any miraculous powers did ever actually subsist in any age of the church, after the times of the apostles. The publication of this piece raised up against him a host of adversaries, who charged him with the most pernicious designs. He had, however, the satisfaction of knowing that the truth of his argument was generally admitted by almost all enlightened and disinterested readers. The author set about preparing an "Answer to all the Objections made against the free Inquiry;" which, however, he did not live to publish. A few months after his death, the greater part of what he had written was given to the world, under the title of "A Vindication of the free Inquiry, &c." In the spring of 1750 he published "An Examination of the Lord Bishop of London's Discourses concerning the Use and Intent of Prophecy." The design of the bishop's discourses was to shew, that there is a manifest connection between the prophecies of every age, from the beginning of the

the world to the commencement of the gospel of Jesus Christ; which chain of prophecies, delivered at different times, and reaching through several thousand years, is yet manifestly subservient to one and the same administration of Providence. Dr. Middleton denied the principle, and laboured to refute the theory of the prelate; maintaining that the authority of the gospel, as far as it is grounded on prophecy, rests on those single and independent predictions, which are delivered occasionally in the law and the prophets, and not on any fanciful scheme of prophecy deduced from Adam and the antediluvian world. Within a few months of the publication of the last-mentioned work, our author's constitution began to give way; and on the 28th of July 1750, he departed this life. His character has been drawn with great accuracy, by the writer of his article in the *General Biography*, from which we shall extract a few sentences. "That Dr. Middleton was a very learned and ingenious divine, will not be disputed by any one. That he was an ardent lover of truth, as well as steady and disinterested in the pursuit of it, may be fairly concluded from the circumstances of his life above related, the sacrifices which he must have made by adopting and avowing sentiments that at once cut off all his hope of preferment, and the firmness with which he encountered the utmost rage and malice of fierce bigots and hypocritical zealots. That he was a sincere believer in the Christian religion, his own express and repeated declarations sufficiently prove, as well as his concise and admirable exposure of one of its most artful and malignant enemies, in his "Letter to Dr. Waterland," and his devoting many of his learned inquiries to its service. His faith he acknowledges was not of that kind which can easily digest incredibilities, but only a principle grounded on the perception of truth, and claiming no other merit than that of being a slave to his reason, to whose dictates it paid an absolute and unreserved submission. Confined within these just limits, however, it produced the noblest fruits, in a life spent in habits of temperance, study, and the search after truth; and which, in other respects, likewise, was as exemplary and agreeable to the rules of the gospel, as that of the most zealous of all his orthodox opponents." There were found among his papers, after his death, materials for a life of Demosthenes, correspondent to that of Cicero. In 1752, his "Miscellaneous Works" were published in four volumes, 4to. of which a second edition was published in five volumes, 8vo.

MIDDLETON, in *Geography*, an interior township, in Essex county, Massachusetts, incorporated in 1728, and containing 598 inhabitants; 20 miles N. of Boston.—Also, a city, post-town, and port of entry of Middlesex county, pleasantly situated on the western bank of Connecticut river. Its public buildings are a Congregational church, an Episcopal church, a court-house, and naval office. It contains about 500 houses, and carries on a considerable trade.

MIDDLETON, a post-town of the county of Cork, Ireland, which was a borough before the union, and which, from its proximity to Cork harbour, has some business, chiefly carried on at the village of Ballinacurra, about a mile distant. Here are an endowed school, a barrack, two bolting mills, and a brewery. The parish, from a union made several years ago, is one of the most valuable in Ireland, being above 3000*l.* per annum. Middleton is 121 miles S.W. from Dublin, and 12 miles E. of Cork, on the road to Youghel.

MIDDLETON, a market-town and parish in the hundred of Salford, and county palatine of Lancaster, England, was first constituted a town in the year 1791, since which time it has been gradually increasing in extent and popula-

tion. The market is held on Friday every week, in a very commodious market-place, laid out by lord Suffield, who is lord of the manor. The government of the police here is confided to two constables, who are chosen annually at the court-leet. In the church, a venerable pile of building, are several monuments of the Atheton family, who for many centuries were resident in this parish. The side aisles of this edifice are embattled; and in the windows appear some stained glass of shields, and other devices. A carved screen of seven compartments divides the chancel from the choir. It is ornamented with a great profusion of armorial bearings of the Athetons, Radcliffes, Grosvenors, and Stanleys. The living is a rectory. Here is a free grammar school, which was founded by Dr. Alexander Nowel, dean of St. Paul's, and principal of Brasen-nose college, in 1572. This is now a most respectable establishment, and frequently contains between 150 and 200 scholars. Dean Nowel was educated at this place. See *Chariton's interesting Life of Nowel*, 8vo. 1809.

The chief support of this town is derived from its cotton manufacture; but there are likewise a considerable twill manufactory, and some bleaching works. The population here, in 1801, according to the parliamentary returns of that year, amounted to 3265 persons. *Beauties of England and Wales*, vol. ix. by J. Britton.

MIDDLETOWN, a township of America, in Strafford county, New Hampshire; about 40 miles N. by W. of Portsmouth.—Also, a township of Rutland county, Vermont; 39 miles N. of Bennington.—Also, a township in Delaware county, New York; 40 miles W. of Catskill.—Also, a township in Newport county, Rhode island, containing 931 inhabitants. In the town, situated on the island which gives name to the state, about two miles from Newport, is a large cavity in the rocks, called "Purgatory."—Also, a town of about 60 or 70 houses in Berkeley county, Virginia, near the North mountain: it has two churches, one for Presbyterians, and one for Baptists.—Also, a small post-town in Newcastle county, Delaware, on Apaquinimy creek; 21 miles S.S.W. of Wilmington.—Also, a township in Monmouth county, New Jersey, which contains two places of worship, one for Baptists, and one for the Dutch Reformed church, and 3226 inhabitants. The salt-works are in North river, which divides this town from Shrewsbury. Here is an academy of 40 or 50 students. The light-house on the point of Sandy-beach is in this township. The high lands of Navesink, which are on the sea-coast near Sandy-beach, are 600 feet above the level of the water, and are the lands first discovered by mariners in this part of the coast.—Also, a flourishing post-town in Dauphin county, Pennsylvania, on the north-west side of Swatara creek, which discharges itself into the Susquehannah, two miles below: it contains a German church, and more than 100 houses, and carries on a brisk trade with the farmers in the vicinity. It is estimated that 200,000 bushels of wheat are brought down the river annually to the landing-place, two miles from the town; 92 miles W. by N. from Philadelphia. N. lat. 40° 12'. W. long. 76 44'. There are also two other townships of the same name in this state; one in Delaware county, and the other in that of Cumberland.—Also, a post-town in Frederick county, Maryland; nearly 8 miles W.N.W. of Frederickstown.—Also, a town in Dorchester county, Maryland; 8½ miles N.W. of Cambridge.

MIDDLEWICH, a considerable market-town in the hundred of Northwich, and county of Chester, England, is situated at the conflux of the rivers Croco and Dane, about 6 miles from Northwich, 22 from Chester, and 167 from London. Its name was derived from its central situation

between the Wiches, or Salt Towns, of which there are three in the county; and its origin has been supposed to be as remote as the time of the Romans; the road to it from Northwich being mentioned by Camden, as raised with gravel to such a height as to be readily known for a work of that people. The church is a spacious structure, and includes two chapels. On the south side is a college, founded by Thomas Savage, archbishop of York. The government of the town is vested in a bailiff and burgesses, annually chosen. Under the population act of 1800, the number of houses was returned as 268, occupied by 1190 persons. Considerable employment is derived to the inhabitants from the manufacture of salt, which has been carried on in this town from a very early period; very valuable brine springs being found in the town and its vicinity. A cotton manufactory has been recently established here. A grammar school was founded at Middlewich about the end of the 17th century: the school-house was given by Ralph Lowndes. Markets are held on Tuesdays and Fridays, and two fairs annually. The parish of Middlewich is very extensive, and comprises 15 townships. One of these, Kinderton, has been decided by Mr. Whitaker to be the Condate of the Romans. Lysons's *Magna Britannia*, vol. ii. *Beauties of England and Wales*, vol. ii.

MIDDLING-TEETH, in the *Manege*, are the four teeth of a horse that come out at three years and a half, in the room of other four foal-teeth, seated between the nippers and the corner-teeth; from which situation they derive the title of *middling*. There is one of them above, and one below, on each side of the jaws. See TEETH.

MIDERFELS, in *Geography*, a town and castle of Bavaria; 12 miles N.E. of Straubin.

MID-FEATHER, in the English *Salt-works*, the name given to a sort of partition placed in the middle of the furnace, over which the pan is set for boiling the sea-water or brine into salt.

This partition divides the body of the furnace into two chambers. See SALT.

MID-HEAVEN, *Medium cali*, in *Astronomy*, is that point of the ecliptic which culminates, or is in the meridian. See CULMINATION.

MIDHURST, in *Geography*, a market-town in the hundred of Eastbourne and county of Sussex, England, is pleasantly situated on an eminence, surrounded by several small hills, and watered by the river Arun. The petty sessions for the hundred, and a weekly market on Thursdays, are held here. In the town is a free grammar school. The church is in the patronage of lord Montague. According to the parliamentary returns of 1801, this town contained a population of 1073 persons, of whom thirty-one only were engaged in agriculture, and 194 in different departments of trade.

Adjoining to the town is a plot of ground, called the *borough* of Midhurst, which has the privilege of sending two members to parliament; though, like the borough of Old Sarum, not a single house stands within its limits. The situation of the burghage tenures, however, is distinctly marked by large stones set up for that purpose. This place possesses its privileges as a borough by prescription, having been the site of a town of considerable importance previous to the Norman conquest. The governing officers here are a steward and bailiff, who are chosen annually at the court leet of the manor, and exercise jurisdiction over the town.

Gale and Stukeley regard Midhurst as the Miba of Ravenna, from a tortuous etymology of its name; but Camden considers the opinion of these antiquaries on this subject as

wholly devoid of probability, all the MSS. being against them.

In a park, at a short distance from the town, stand the ruins of Cowdray house, which was formerly the seat of the ancient family of Montague. This noble edifice was destroyed by fire in 1793, when most of the furniture and valuable paintings which it contained were consumed. It was an immense building, of a quadrangular form, with a court in the centre, which was ornamented with a fine reservoir of water. An account of this house, with views of it, were published in the *Vetusta Monumenta*, by the Society of Antiquaries; but it is to be regretted that the history of the town has never been laid before the public. Our chief authority for this article is Hay's *History of Chichester*, 8vo. 1804, which is very unsatisfactory.

MIDIAH, a town of European Turkey, in Romania, on the Black sea; 69 miles E. of Adrianople.

MIDIAN, *Land of*, or *Midianitis*, in *Ancient Geography*, a country inhabited by the Midianites, who were the descendants of Abraham by Keturah, and who were seated on the N. of the Amalekites; having the Dead sea on the W., the Ishmaelites on the E., and the Moabites and Reubenites on the S.; the river Arnon parting them from this last tribe. Their country was hot, sandy, and in many parts of it quite desert; yet it abounded with cattle, particularly with camels, which were useful beasts of burden for their caravans, with which they traded into Egypt in the time of the patriarch Jacob. The land of Midian was divided into a kind of pentarchy, or five kingdoms, in the time of the Exodus; so that the Israelites, in the war which they waged with the Midianites, are said to have slain its five kings, whose capitals are supposed to have been situated near the Dead sea. They had also a famous metropolis, called after the name of their progenitor, often mentioned in the prophetic books of scripture, as well as by other authors; particularly by Josephus, who places a town of that appellation near the Red sea, not far from the spot where Ptolemy places that of Madiana. (See MADIAN.) Besides these towns, there were in this country Dibon-Gad, a large town on the river Arnon, and Almon-Diblathaim, not far from it, Beeroth, so called from its many wells, and some others, placed by geographers within the Midianitish territories. As to the city of Midian, it is probable that they rebuilt it, after the havoc committed upon them by the Israelites, because Eusebius and St. Jerom, who place it on the river Arnon, eastward of the Dead sea, and south of Ar, or Arcopolis, inform us, that in their time some remains of it were visible.

MIDIANITES, in *Ancient History*, derived their origin and name from Midian, the fourth son of Abraham by Keturah. He, as well as the rest of his brethren, having received a portion from their father, were sent into the East country, that they might be at a proper distance from Isaac. The Midianites, in early times, were confounded with the Ishmaelites (see that article); and many ages afterwards they are mentioned in conjunction with the Nabatæans and Kadarenes, the posterity of Nabioth and Kadar, the sons of Ishmael. We also find them so incorporated with the Moabites, that Moses seems to have regarded them as almost one nation. Their religion was the same, and they acted in the strictest concert together against him and the Israelites. They were likewise united by ties of blood with these nations, as on the one side they were descended from Abraham, and on the other from Lot; and, moreover, as they happened to live in the northern and southern parts of their country, they joined either the Moabites or the Ishmaelites. The Midianites were a very numerous race, and

and may be distinguished into two classes, viz. shepherds and merchants. The shepherds moved here and there in tents, and drove their cattle before them; even when they went to war. The merchants also travelled from place to place in companies or caravans, as the merchants of those parts do at this day, and left the care of their cattle to the women. The former had probably no fixed habitations, except some strong holds near their borders; the merchants also had few or none but inns or stations, in places convenient for their trade. These, by exchanging their gold and jewels with their brethren for their cattle, enriched the shepherds with precious ornaments. Their manners respectively differed according to their mode of life; but they are in general represented as being very sumptuous in their apparel. (See *Judg.* viii. 26.) From the book of *Job* (ch. xix. 23, 24.) we learn, that the use of writing was known at an early period in those parts among the descendants of Abraham; and the Midianites being of the number, we may reasonably suppose, could not have been unacquainted with it. They must also have had some knowledge of arithmetic, and also of ship-building; so that we may extend the circle of their sciences beyond writing and arithmetic, and allow them a competent skill in geography, geometry, and astronomy. The Midianites varied in religion as much as in their manner of life. In the north of Midian they appear in the days of Moses to have been addicted to all the abominations of the Moabites; but in the south we find that they were attached to a rational and sublime system, long after their brethren had sunk into the grossest corruption. The government of the Midianites is represented rather as aristocratical than monarchical. Their chiefs, however, are styled kings. The most ancient account of this nation that occurs, after what we have already stated, is that of their war with Hadad the Horite, when Midian was smitten by him in the field of Moab. The next is that of their purchasing Joseph from his brethren for twenty pieces of silver, and carrying him away with them into Egypt. See the article *JOSEPH*.

Many years after this event there lived in Midian, near the Red sea, a priest or prince of the southern Midianites, called Jethro; whose daughters were molested by some shepherds, and prevented from procuring water for their father's flocks. On this occasion Moses, who in his flight from Pharaoh had arrived in Midian, interposed on behalf of these females, and caused the shepherds to retire. In consequence of this seasonable act of kindness, Moses was invited to the house of Jethro, who gave him one of his daughters in marriage, and kept his son-in-law with him forty years. (See the article *MOSES*.) When Moses overcame Sihon the Amorite, the Midianites were at enmity with Israel; at least those who bordered upon the Moabites; and they seem about this time to have been very active in seducing the Israelites from the worship of God to idolatry. The Jewish lawgiver, however, made preparation for invading their country, and they fortified their castles and combined all their strength in order to resist the enemy. Their efforts were unavailing; as they were defeated with great slaughter, and all their cities and castles were laid in ashes, and their country plundered and desolated. About 150 years after this slaughter of the Midianites, two kings, named Zebah and Zalmunna, appeared as their conductors in a war against the Israelites; and they were joined by the Amalekites and Arabians. The destruction occasioned by these combined forces continued for seven years; and the Israelites were compelled by the ravages of the plains and by want of sustenance, to retire to the mountains, and shelter themselves in caves and fortresses. Gideon, however, exerted himself

for the rescue of his country; and his efforts were so successful, that the Midianites never afterwards presumed to contend with Israel. They were, however, a powerful nation many ages after this event, as well as famous for their industry, riches, and the magnificence of their tents; but in the first century of the Christian era their name sunk into disuse, and was swallowed up by that of the more powerful people of Arabia. Between 3 and 400 years ago there was a ruined city, which bore the ancient name, in the neighbourhood of which they pretend to shew the place where Moses watered his father-in-law's cattle. Abulfeda calls it Medyan, and Moses's father-in-law, Shoaib; and the place is still one of the stations in the pilgrimage from Egypt to Mecca, under the name of Shoaib's cave. *Anc. Un. Hist.* vol. ii.

MIDNAPOUR, in *Geography*, a river of Hindoostan, situated partly in Bengal, and partly in Orissa; bounded N. by Burdwan and Pachete, E. by Bissunpour and Hoogly, S. by Mohurbunge, and W. by Allahabad, about 110 miles long, and from 30 to 40 broad. The capital of the same name is a town of Bengal; 60 miles W. of Calcutta. N. lat. 22° 28'. E. long. 87° 27'.

MIDNIGUNGE, a town of Hindoostan, in Oude; 25 miles N. of Allahabad.

MIDNOI. See *COPPER Island*.

MIDNYPOUR, a town of Hindoostan; 35 miles N.E. of Benares.

MIDONNO, a town of Japan, in the island of Nippon; 85 miles N.N.W. of Jedo.

MIDRIFF, in *Anatomy*. See *DIAPHRAGM*.

MIDSAMA, in *Geography*, a town of Japan, in Nippon; 12 miles N.E. of Tomu.

MIDSHIP, is a term of distinction, applied by shipwrights to several pieces of timber which lie in the broadest part of the vessel, called the *midships*, although it is not in the middle of her length with regard to the breadth; it is a supposed line from the stem to the stern-post.

MIDSHIP-Beam, is the beam upon which the extreme breadth of the ship is formed, and which is situated in the midship frame, nearly in the middle of her length, serving as a standard from whence the dimensions and proportion of the mast and yards are to be taken. See *BEAM*.

MIDSHIP-Frame, is a name given to that timber, or combination of pieces, formed into one timber, which determines the extreme breadth of the ship, as well as the figure and dimension of all the inferior timbers.

MIDSHIP-Men, are officers on board a ship of war, whose station, when they are on duty, is, some on the quarter-deck, others on the poop, &c.

Their business is, to mind the braces, to look out, and to give about the word of command from the captain, and other superior officers. They all assist, on occasion, both in sailing the ship, and in stowing and rummaging the hold; and in performing the necessary business of the vessel, either aboard or ashore. The number of midship-men, like that of all other officers, is always in proportion to the size of the ship to which they belong. Thus a first-rate man of war has twenty-four, and the inferior rates a suitable number in proportion. No person can be appointed a lieutenant, without having previously served two years in the royal navy in this capacity, or in that of mate, besides having been at least four years in actual service at sea, either in merchant ships, or in the royal navy.

MIDSUMMER-DAY, is the festival of St. John the Baptist, held on the 24th of June. See *QUARTER-Day*.

MIDWAY, in *Geography*, a town, or rather a village, of America, in Liberty county, Georgia, 10 miles N.W. of Sunbury.

Sunbury. Its inhabitants are descendants of emigrants from Dorchester, near Boston, who migrated in 1700.—Also, a township of Rutland county, Vermont; E. of and adjoining Rutland.

MIDWIFE, a woman employed in assisting women in child-birth. Johnson supposes it to be derived from a Saxon word, meaning mead, or reward. As the practice of midwifery was entirely confined to women, until very lately, we have no term by which to denominate a male practitioner, but the barbarous compounded one, man-midwife. Had a more significant term been found for the women, we might have used it as we have the word author, from which we have made authoress, a female writer; though we think Johnson neither admits that word, nor the word man-midwife into his dictionary. The Romans, entertaining, perhaps, a more favourable opinion of the capacities of women, have the word *auxilium*, a female writer, from *auxilium*, which seems to justify us in the use of the word authoress. The French, more fortunate, call a midwife an *accoucheuse*, from the verb *accoucher*, to put to bed, and the male practitioners, *accoucheurs*; a term which we have now pretty generally adopted.

MIDWIFERY is the art of delivering women of their young. It must be nearly coeval, as a practice, with the creation. At first it was very simple, and consisted solely in the knowledge of the method of dividing the navel-string. Animals usually bite it asunder with their teeth. Women, probably, first made use of the sharp edge of a stone, or of a shell, for the purpose, which is the mode still practised in barbarous countries. As difficulties would occasionally occur, either in the exclusion of the fœtus, or of the placenta, or after birth, some female friend, or relative, would be called upon to give assistance. If the placenta happened to be detained beyond the usual time, which is one of the most ordinary accidents in labours, the assistant would naturally attempt to draw it away by the funis, which she would find hanging from the pudenda. If a leg or arm of the fœtus presented, instead of the head, she would, doubtless, take hold of the presenting part, and endeavour by that means to draw the child from its confinement. In these attempts, if it should be one of the lower limbs that presented, her exertions would generally be crowned with success; but as the obstacle making assistance necessary, supposes a relative disproportion between the birth and the passage through which it is to pass, the child would usually be dead born. On the other hand, if an arm presented, the same success would attend the exertions of the midwife in a few cases only; as in premature birth, or where the child happened to be remarkably small. It would more commonly happen, that all attempts to bring the child in that posture would fail; but the uterus persisting to exert itself, or, in other words, the labour-pains continuing, they would sometimes thrust down the feet, or the breech of the child, the head and shoulders gradually receding, and rising upwards, and it would at length be forced into the world in that position. In these cases, though the child would be dead, the woman would frequently recover. It would more often happen, that this evolution would not take place, and that the woman, exhausted by long continued and fruitless exertions, bruised and injured by the pressure of the fœtus, and tormented by the distention of her bladder, no access being allowed to the urine, would fall a sacrifice to the pressure of so many accumulated evils.

Some of the earliest means made use of in tedious and difficult labours, appear to have been, anointing the pudenda with oils, and putting the woman into warm baths, as we find it recommended by Hippocrates, Avicenna, and other

ancient writers; by these means they hoped to relax the parts, and render them more easy of distention, and thence to procure a freer passage for the fœtus. This continued to be the practice for many ages.

From examining the little that has been written by the ancients on the subject, it is evident they had no knowledge of that species of obstacle to the birth of the child, which is occasioned by the mal-conformation of the bones of the pelvis of the woman. They attributed the whole of the difficulty to a rigidity of the muscles, or of the ligaments connecting the bones of the pelvis together, which they hoped by these means to loosen.

Hieronymus Mercurialis, who flourished about the middle of the sixteenth century, tells us, it was not unusual to put women on a course of bathing and anointing several weeks before they attained to the period of parturition. Speaking of what is to be done, prior to the labour, he says, "Utatur balneis aquæ dulcis, in quibus herbæ laxantes et emollientes coquantur. Inungatur etiam eodem tempore, dorsum, et pectus, similiter loca muliebria iis linimentis, quæ possunt emollire, et lenire." (De Morb. Mul. lib. ii.) Another custom which was probably only practised among the common people, was placing the parturient woman in an erect posture, that they might profit by the weight of the fœtus, and shaking them strongly; thinking, probably, that the child would drop down, as fruit falls from the tree.

"Alii," Moschioni says, (Harm. Gynæc. p. 11.) "ad scalas ligabant, et sic pendere jubebant; alii infinitum deambulare et salire cogebant; alii scalas ascendere; alii autem, manibus sub axillis missis, a terra subleabant, et diutius exagitant." Hippocrates had long before, and probably with the same view, recommended in cases where the head of the child presented, but on account of the straightness of the passage was detained above the brim of the pelvis, to anoint the parts, and to put the woman into a bath of warm water. These methods failing, the head of the child was to be opened with a scalpel, and then to be extracted with a strong iron pincers, or hooks. "Caput gladiolo dissectum. Instrumento quod constringat comminuto, et officula per ossium volsella extrahito, aut unco attractorio ad clavicularum uti firmiter adhzreat immisso, non confestim, sed paulatim remittendo, et rursus adurgendo, extrahito." (Hip. Oper. Om. Fælio. p. 618.) Celsus recommends a similar practice, (lib. vii. cap. 29. De Medicina.) Avicenna mentions a kind of fillet that was used in these cases. (See the article **FILLET**.) This contrivance, although it had a few favourers, was never in general use; the more common method in tedious and difficult births was to diminish the bulk of the child, or of the part nearest to the external surface, with scalpels, or other cutting instruments, and then to draw it away with iron hooks, pincers, or forceps, armed with teeth. Those who wish to see the forms of these instruments, or a more particular account of the methods of applying or using them, may consult Albucaasis's *Methodus Medendi*, lib. ii. and Ruett, *De Conceptione et Gen. Hominis*, in which many of them are particularly delineated and described.

As cases of such difficulty as to render the use of instruments necessary are rare, not occurring oftener than once in five or six hundred labours, and as the practice of midwifery was for many ages, indeed so late as to the end of the sixteenth century, almost exclusively in the hands of women, it is not to be wondered at, that little improvement was made in the method of assisting women in the only cases that would come under the care of the surgeon, until a very late period. Hippocrates having learned that in ordinary births the child presented with its head to the orifice of the womb, thought that in all cases, when it offered in a different posture,

posture, it ought to be pushed back, in order to bring down the head. Thus he attempted to do even when the breech or the feet came first. If an olive he lays, comes into the neck of a bottle across, and you attempt to bring it through in that posture, you will either crush the olive, or break the glass; but as it is of little consequence which of the ends of the olive comes first, he should have seen, that it is nearly equally immaterial which end of the child comes first. This, however, does not seem to have occurred to him, and as his name was of great authority in every thing relating to medicine, his rules continued to be followed until the middle of the sixteenth century. Ambrose Parey, who flourished about that time, first recommended turning the child and bringing it by the feet in all cross presentations. This may be considered as the first material improvement that had been made in the practice of midwifery. The rule was further explained and extended by his pupil Guillemeau, and afterwards by Mauriceau, Le Motte, Peu, Puzos, and other French writers, and it has long since been adopted by the practitioners in the art in every part of Europe, not only in cross-births, but in all cases of flooding, in whatever posture the child may present, also when the funis umbilicaris comes down before the head of the child, and by some surgeons, as we shall see by and by, in cases where the forceps or lever are now ordinarily used.

A few years before Ambrose Parey's book appeared, Eucharius Rhodion, a physician of Frankfort, published the first popular work that we are acquainted with on the subject. As it was intended for the instruction of the midwives, it was printed at first in the German language. In 1532, it was translated into Latin, under the title of "De partu hominis," and in a few years after, into French, English, and other modern languages. The practical rules recommended by him, are such as he had learned from Hippocrates, Avicenna, and other ancient writers. In cross presentations, the midwife was to endeavour to bring down the head; when this could not be effected, if the breech, or feet, were next the uterine orifice, the child was to be allowed to come into the world in that posture, taking, however, especial care, he says, that the hands should be brought down, and placed one on each side of the body of the child, a rule which could not possibly be followed, and which shews that the writer had never practised the art. The same censure may be passed upon almost every regulation, that had been hitherto promulgated on the subject. Nearly all of them tending rather to mislead, than to inform the practitioner, and to increase rather than diminish the pain, difficulty, and danger of the labour.

We have two translations of Rhodion's book into our language. The first by Richard Jones, who dedicated it to Katherine, queen to king Henry VIII. It was printed in the year 1540, and is decorated or illustrated with some indifferent engravings on copper, which, however, are esteemed, as being the first specimens of the kind executed in this country. In 1545, Thomas Raynold, physician, published a second translation. This has passed through several editions, under the title of "The Birth of Mankind," and was nearly the only manual used by the midwives until the year 1672, when Dr. Hugh Chamberlen gave a translation of Mauriceau's "Treatise on the Art of Midwifery," in which the first dawning of a rational practice of the art appears. In the preface to the translation, Dr. Chamberlen announces an invention, "known only," he says, "to his father, brothers, and himself, with which they were enabled to terminate the most difficult labours, without injuring either the mothers or the children." Though he gives no intimation by which it could be discovered what were the means used

for the purpose, yet it was in time found out to be the forceps. The merit of the invention consisted in making the blades of the instrument separable, and capable of being locked, or united together, after being introduced into the vagina, and placed one on each side of the head of the child. (See the article FORCEPS, in *Midwifery*.) A most invaluable discovery, and which has deservedly immortalized the inventor. (See CHAMBERLEN, HUGH.) But he at first very much overrated their power, imagining that they were applicable in all cases, where the head of the child was "enclavée," or fixed in the pelvis, not having met with a case, we may suppose, where the bones forming that cavity were considerably distorted. Accordingly he undertook to deliver a woman whose pelvis was so contracted and narrow, as to render it impossible that the head of a full grown fœtus should pass through it undiminished. The operation, or trial, which was performed at Paris, where he went with the view of selling his secret, failed. Mortified at the check he received, he left the country, and went to Amsterdam, where he is said to have sold the secret to Roonhuysen, a surgeon in great practice in that city, who has the credit of having invented the lever which bears his name. See that article.

About the same time Deventer, an eminent surgeon of a town in Holland of that name, acquired considerable fame by his practice in the obstetric art. As the form, as well as the manner of using the forceps and lever were kept secret by the proprietors of those inventions, or only disclosed to persons who would pay a large sum of money for them, Deventer declaimed violently against the use of instruments, affirming he could terminate the most difficult labours with his hand alone. He contended that the greatest obstacle to the birth of the child arose from the oblique position of the uterus, its fundus falling too much forward, or to one side of the abdomen of the mother. The head of the child was therefore forced by the pains, either against the sacrum, or against one of the sides of the pelvis, instead of being directed into the centre of that cavity. In all cases of difficulty, if the head of the child was not forced down so low as to render it impracticable, he passed his hand into the uterus, turned the child, and delivered it by its feet. When that could not be done, he introduced his left hand into the back part of the vagina, and gradually pushed back the bones of the coccyx, so as to give space sufficient for the head of the child to pass. In cases where the pelvis was distorted, he must necessarily have failed in his attempt, for the same reason that Chamberlen failed with his forceps, but as such cases would only occur once in five or six hundred labours, that small number of exceptions would give little check to his fame, which was continued to his name for many years after his death. This doctrine and practice, which have long since been exploded, were patronized in this country by Mowbray, sir Richard Manningham, and Eaton, who were all averse to the use of instruments.

The construction and use of the forceps being at length made public by Mr. Butter in the third volume of the *Medical Essays* in 1732, and more fully by Chapman in 1734, and that of the lever by M. Preville, in his translation of Smellie's *Midwifery* into French, published at Paris, in 1754, the teachers of the art were careful in instructing their pupils in the method of employing those instruments, which have entirely superseded the rude practice of Deventer. The *perforator* and *scrotchet* (see those articles) came into use about this time, and continue to be employed in the few cases that require such assistance, in the place of the scalpel, and the forceps with teeth.

Practitioners in the art being now possessed of such powerful

erful assistants, it was to be feared they might be induced to have recourse to them for the purpose of accelerating the labour, in cases where there were only such obstacles as in a moderate space of time would be overcome by the pains. Cautions against this fascinating practice are found in all the late treatises on the art. Smellie, who had a larger share of practice, and who instructed a greater number of pupils than any other professor in his time, is frequent in his admonitions against using art, other than in aid of nature, where she is absolutely and decidedly incompetent to the completion of the labour. How seldom also this happens, he is careful to inform them. He very much simplified the form of the forceps, and that they might not be used before the head of the child had descended sufficiently low in the pelvis, he considerably reduced them in length; he also contrived a method of locking them, much more convenient than had been before used. Before he retired from the practice, in which he introduced several valuable improvements, he published, in 1752, "A Treatise on the Theory and Practice of Midwifery," which contained the substance of every thing that was useful, that had been printed on the subject, as well as the result of his own extensive practice. This was followed by a set of plates, in large folio, correctly drawn and well engraved, illustrating his practice. Soon after he published two volumes of cases, arranged in classes, referring to his treatise, and shewing the efficacy of the rules he had there inculcated.

While Smellie was making large strides toward improving every part of the practice of midwifery, and bringing it to perfection, Levret, and various other writers on the continent, were exerting themselves in a similar manner, and with perhaps equal felicity. In the mean while, hospitals and other institutions were formed, for the reception of parturient women. As the management and care of these were under the immediate direction of the physicians and surgeons, and the opportunity which for so many ages had been wanting, of acquiring an exact knowledge of the process of a natural labour, and of the obstacles that occasionally obstructed its progress and completion, was now obtained. To this also, the change that had been taking place, within something more than a century, in the opinions and manners of the public had contributed. Several physicians and surgeons had, in the course of that time, applied themselves to the practice of midwifery. Hence we find, Mauriceau, Deventer, Ruysch, Roonhuysen, our countryman Dr. Chamberlen, and others, enjoying a considerable portion of practice in the art.

The custom of employing men in the place of women, originated among the ladies of the highest rank in France, and gradually descended to the middling and lower classes of the people. The advantages derived from the change, both in the manner of conducting the labour, and in the management of the woman and child after the labour, became so obvious, that the practice has by degrees spread over all Europe. That the poor who could not, and a few who from prejudice still refused to employ men, might reap the benefit of the improvements that have been made in the practice of the art, no women are now allowed to engage in the business, who have not been previously instructed by some public teacher, and who do not obtain from him certificates of their qualifications. The consequence of these arrangements has been, that every part of the art has been investigated with the greatest care, and such has been the zeal of the professors, or persons engaged in the practice, that the works on the subject of midwifery, which have been published within less than a century, are sufficiently numerous to form of themselves no inconsiderable library. Thus this art, which was

so late in being cultivated, has already attained a degree of perfection, that puts it on an equality, at least, with any other branch of medicine. Of this great mass of publications, many of them excellent, it may be sufficient to mention, among foreign productions, Puzo's "Traité des Accouchemens," Baudelocque's "Art des Accouches," Crant's "De Re Instrumentaria," and the "Opuscula" of Roederer, and of Plenck, which embrace the whole circle of the art. Among our own writers, White "On the Management of Pregnant and Lying-in Women," and Rigby "On Uterine Hemorrhage," have each in their way given directions that are calculated to abide the test of time. "Observations on human and comparative Parturition," published in 1794, may be added, as containing a number of curious and useful facts not generally known or attended to. The late Dr. William Hunter's splendid plates of the human gravid uterus, and not more splendid than correct, places before our eyes the fœtus at different periods of its existence, shews the posture in which it lies in the uterus, and the manner in which it is connected with that viscus; and lastly, Dr. Denman's "Introduction to the Practice of Midwifery," which has already passed through several editions. For comprehensiveness and exactness, it holds the same rank now that Smellie's Treatise did at the time when it was published, embracing and explaining, in a luminous and judicious manner, every thing, we believe, that is known on the subject.

MIEDNIKI, in *Geography*. See MEDNIKI.

MIEDZIAL, a town of Lithuania, in the palatinate of Wilna; 52 miles S. of Breslaw.

MIEDZINECZE, a town of Poland, in the palatinate of Brzesk; 25 miles W. of Brzesk.

MIEDZIRZECZKA, a town of Poland, in the palatinate of Volhynia; 52 miles N.N.W. of Zytomiers.

MIEDZYRZECZ, a town of Lithuania, in the palatinate of Novogrodek; 44 miles W.S.W. of Novogrodek.

MIEDZYRZYCZ, a town of Russian Poland, in the palatinate of Kiev; 32 miles W.S.W. of Czyrkafy.

MIEGIA, in *Botany*, appears to have been named by Schreber in honour of two Swiss anatomists and botanists, who flourished in the beginning and middle of the last century. Most probably they were father and son, but we are not sufficiently acquainted with their history positively to assert this. John Rodolph Mieg published his inaugural Dissertation on *Chamæmelum leucanthemum* at Basil, in 1721, which was reprinted two years afterwards. Achilles Mieg published a work in 1751, at the same place, which he calls *Specimen observationum anatomicarum atque botanicarum*, and in this are described some rare grasses, as well as the genus *Montia*. Schreb. 786. Willd. Sp. Pl. v. 1. 311. Mart. Mill. Dict. v. 3. (Remirea; Aubl. Guian. 44. Juss. 34. Lamarck Illustr. t. 37.)—Class and order, *Triandria Monogynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume single-flowered, of two, ovate, concave, ribbed valves; the upper shorter and obtuse; the lower somewhat longer and rather acute. *Cor.* of two, swelling, ribbed valves; the outer ovate, obtuse, within the lower calyx-valve, and longer than it; the inner oblong, compressed at the top, rather acute, with folded margins, longer than the outer, within the upper calyx-valve. Nectary of one leaf, ovate, gibbous at the back, slightly compressed, acute, smooth, thick, corky, thinner at the tip and margins, shorter than the corolla, opposite to its inner valve, enclosing the germen. *Stam.* Filaments three, capillary, longer than the corolla; anthers oblong, acute. (Aubl.) *Pist.* Germen oblong, nearly triangular, within the nectary; style simple, capillary, longer than the corolla; stigmas two, capillary. *Peric.* none. *Seed* solitary, oblong, triangular, approaching

approaching to globose, wrapped up in the nectary, and enclosed by the permanent calyx and corolla.

Ell. Ch. Calyx of two opposite valves, single-flowered. Corolla of two valves. Nectary of our leaf, enveloping the germens.

Obl. The above generic character was made by Schreber, from the parts of fructification as they were found by him in a dried specimen. The nectary he observes is remarkable. Aublet's character of *Remirea* is very different from that of Schreber's *Miccia*.

1. *M. mariima*. Willd. n. 1. (*Remirea maritima*; Aubl. Guian. t. 16.)—A native of the sea shores of Cayenne and Guiana, flowering and bearing seed at various times of the year.—Root perennial, creeping, long, branched, knobbed, solid. Stems about six inches high, branched at their summits, leafy and scaly below. Leaves oblong, narrow, rigid, striated, acute, rough at the margin, sheathing at the base. Flowers crowded together into a nearly sessile, terminal, short and thick panicle. The roots, when bruised or mallicked, afford a grateful, aromatic smell, shewing an affinity to the genus *Cyperus*, from which indeed this plant seems to differ chiefly in its solitary florets, and corky nectary.

MJEIBOW, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 58 miles W.S.W. of Novogrodek.

MIEKOW, a town of Austrian Poland, in the palatinate of Cracow; said to have been built after the model of Jerusalem by Gripfius Jaxa, after his return from a pilgrimage to that city; 12 miles N. of Cracow.

MIEL, JAN, in *Biography*, a painter, known in Italy by the name of Giovanni della Vite, probably because he chose to disregard the grand style of art in which at first he practised with Andrea Sacchi, and paint common nature and living objects.

He was born in Flanders in 1599, and first learnt to paint under Gerard Segers; but he soon left him, and went to Italy, where he studied the antique and the works of the best masters with great success, and was employed to paint pictures as large as the life for several of the churches in Rome. He had the honour to study in the academy of Andrea Sacchi, then in great repute, and was invited by him to assist in a large picture he was then engaged upon; but they soon disagreed, and Miel left his master in disgust, piqued with a satiric expression of Sacchi concerning his talent for painting *bambocciate*, or scenes of merriment, drolls, &c. his imagination principally leading to such subjects.

In consequence, he set himself afresh and with increased diligence to study the grand style, and rival Sacchi; but after a time gave it up almost altogether, and painted those subjects for which nature appears to have designed him, with a portion of talent nearly equal to Bamboccio himself. His success was fully equal to his skill, and he filled the cabinets of the nobility of Rome, Florence, and other places, with his ingenious performances.

The lustre of his fame induced Charles Emanuel, duke of Savoy, to invite him to Turin, where he arrived in 1659, and was received by his highness with great respect, and engaged to paint for him several pictures relative to the chase, in which he introduced an immense number of small figures of persons of all ranks, horses, dogs, different species of game, &c. all which he finished so much to the satisfaction of the duke, that he honoured Miel with knighthood, and besides paying him handsomely for his pictures, presented him with a cross ornamented with diamonds of great value.

He remained at Turin six years, during which time he painted a great number of pictures, and at the end of it died of a slow fever, or rather consumption, brought on, Baldi-

nucci assert, by his uneasiness at not obtaining his patron's permission to revisit Rome.

MIELAN, in *Geography*, a town of France, in the department of the Gers, and chief place of a canton, in the district of Mirande; 6 miles S.S.W. of Mirande. The place contains 1403, and the canton 10,121 inhabitants, on a territory of 27 $\frac{1}{4}$ kilometres, in 29 communes. N. lat. 43° 25' E. long. 0° 23'.

MIELEC, a town of Poland, in the palatinate of Sandomirz; 56 miles S.W. of Sandomirz.

MIELNICK, a town of Poland, in the palatinate of Bielsk; 44 miles S.W. of Bielsk.

MIEN, a town of China, of the second rank, in Setchuen; 56 miles W. of Pao-king. N. lat. 51° 28'. E. long. 104° 29'.

MIEN-TAM-KEOU-TOUKA, a town of Chinese Tartary. N. lat. 41° 1'. E. long. 119° 43'.

MIEN-YANG, a town of China, of the second rank, in Hou-quanz. N. lat. 30° 12'. E. long. 112° 49'.

MIER-CHAS-KUN, a town of Persia, in the province of Farfistan, containing about 400 houses and several bazars, the ruins of Persepolis; 40 miles N. of Schiras.

MIERIS, FRANCIS, in *Biography*, a most admirable painter of the Flemish school, who was born at Leyden in 1635. He acquired the principles of the art under Gerard Dow, who honoured him with the title of prince of his disciples, and this praise he justly merited, for he more nearly approached the purity and delicacy of Dow than any other man has ever done; indeed, in some respects he became viceroy over that king of high and minute finishing, being more agreeable in his designs, and having more correctness in drawing.

He painted portraits with great delicacy, but his general subjects were conversations, persons performing on musical instruments, doctors with their patients, and such like: these he treated with great ingenuity in composition and execution; painting his draperies with so much minuteness, that all the peculiarities of their different textures are visible. Silk, velvet, stuff, carpets, &c. all were not only marked with their general characteristic appearances, but the threads of their texture were made as visible as in nature, and rendered completely deceptive. It is this attention to minutia, united to breadth and truth, which give so much value to his works; which are very rare, and very costly of course. His own valuation of his time was a ducat an hour: and for one picture of a lady fainting, with a physician attending her, and applying remedies, he was paid at that ratio, so large a sum as fifteen hundred florins. The grand duke of Tuscany is said to have offered 3000 for it, but was refused. One of the most beautiful of the works of Francis Mieris, in this country, where they are not very common, is in the possession of Mr. P. H. Hope, and is known by the appellation of the "Shrimp Man." He died in 1681, and is called by connoisseurs the Old Mieris, to distinguish him from his son,

MIERIS, WILLIAM, who of course is called the Young. He was born at the same place as his father, and learned from him the art of painting, till he arrived at the age of 19; when, his father dying, he was left to follow the dictates of his own mind, which happily led him to study nature, and in that study he made a considerable progress towards obtaining an equal reputation with his father.

At first he painted the same subjects as his father, but afterwards, ambitious of a nobler fame, he attempted higher subjects, but not being prepared with proper studies, he did not succeed so happily as his adventurous spirit deserved. He sometimes painted landscapes and animals, and also modelled his figures with very considerable skill. Probably

this division of his time and studies operated to prevent his arriving at the same degree of excellence in minute finishing as his father: certain it is, that his works will not bear the comparison, being poor and thin, and wrought by a less full, and more timid pencil. He died in 1747, aged 85, and left a son, Francis Mieris, born at Leyden in 1689, who not having the talent of originality, employed himself in copying the works of his father and grandfather; and it is most likely, that nine out of ten of the works distributed at sales under the name of Mieris, are the second-hand productions of this, the younger Francis.

MIES, or MUZA, in *Geography*, a town of Bohemia, in the circle of Pilsen; 14 miles W. of Pilsen. N. lat. 49° 43'. E. long. 13° 6'.

MIETOU, a town of Sweden, in the government of Abo; 14 miles N.W. of Abo.

MIEZA, a town of Spain, in the province of Leon; 42 miles W. of Salamanca.

MIFFLIN, a county of Pennsylvania, in America, surrounded by Lycoming, Franklin, Cumberland, Northumberland, Dauphin, and Huntingdon counties; containing 1851 square miles, 1,184,960 acres, and divided into eight townships. The mountains of this county abound with iron ore, and several forges have been erected for working it. It is well watered by the Juniatta and other streams; it has several mineral springs, and abundance of lime-stone. This county and Center contain 13,609 people. The chief town is Lewistown.—Also, a small town in the above county, on the E. side of the Juniatta; 12 miles E. of Lewistown.—Also, a fort on a small island, at the mouth of Schuylkill river; about six miles S. of Philadelphia.

MIFFLINBURG, a post-town of Northumberland county, Pennsylvania; 218 miles from Washington.

MIGLERE, LA, a town of Italy, in the department of the Po, on the Stura; 24 miles N.N.W. of Turin.

MIGLIAJO, in *Commerce*, a weight and measure by which oil is sold at Venice: the weight = 40 miri, each being 25lb.: the measure = 1210lb., or 40 miri, each = 30 $\frac{1}{2}$ lb.: so that such a miri corresponds to about 4 $\frac{1}{4}$ English gallons.

MIGLIANICA, in *Geography*, a town of Naples, in Abruzzo Citra; 7 miles E. of Civita di Chieti.

MIGLIANO, a town of Naples, in Principato Ultra; 15 miles N.N.E. of Conza.—Also, a town of Italy, in the department of the Lower Po; 15 miles E. of Ferrara.

MIGLIAVACCA, GIOVANNI AMEROSIO, in *Biography*, counsellor of legation, and opera poet to the elector of Saxony, king of Poland, author of an opera intitled "Solimano," and of many cantatas performed at Vienna and Dresden. This poet endeavoured to imitate the elegant and natural style of the amiable Metastasio.

MIGLIONICO, in *Geography*, a town of Naples, in Basilicata; 9 miles S.W. of Matera.

MIGNANO, a town of Naples, in Lavora; 11 miles N. of Sezza.

MIGNARD, PETER, in *Biography*, an historical and portrait painter, born at Troyes, in Champagne, in 1610. He was the disciple of Vouet, but quitted his school at an early period of his life, and went to Rome, anxious to see and study the works of Raphael, Michael Angelo, and the Caracci. He there lived with Du Fresnoy, and they studied together the noble works of art which that city presented to them; they also travelled together to Florence and Venice, that they might leave no source of improvement unsought which the extraordinary talents of their great predecessors had prepared and left for their study and imitation.

The residence of Mignard at Rome, which he prolonged

for 22 years, and the style he acquired of composition and drawing by the imitation of the Roman masters, together, obtained for him the appellation of the Roman; but to judge candidly, one would imagine that the former was the principal cause of that denomination; for his style of design favours too much of the flutter of the French school, instead of the chaste simplicity of Raphael and the best of the Romans.

Mignard enjoyed a full share of favour and fortune during his life. He painted portraits of the popes Urban VIII. and Alexander VII., together with those of many of the nobility of Rome.

Louis XIV., hearing of his fame and abilities, sent for him to Paris, and is said to have sat to him for his portrait ten times. Almost all the illustrious nobles of the French court followed the example of their sovereign, and were painted by Mignard. His style of execution in these portraits is wrought up with all the false taste and pompous parade which distinguished that vicious period of the French nation; when parade passed current for true splendour; what was only specious or subtle, was received as useful and learned; and bombast assumed the station due only to true dignified simplicity. His pictures are all flutter; every thing seems in motion; even when the scene is laid in a close room, the draperies are flying about as in a high wind. The actions of his figures are in assumed airs, like pompous, and not unfrequently bad actors, and the colouring of his pictures, though fresh and vigorous, is not true, but teinted, and reminds the observer of the palette. With these defective points in his character as an artist, Mignard is not unworthy of regard. His drawing is correct: his arrangement of parts is ingenious: and his invention fertile. He contrived to make his pictures ornamental, and is the best portrait painter of the French school.

His patron, Louis, ennobled him; and, after Le Brun's death, appointed him his principal painter, and the director of the manufactories of Seve and the Gobelins. He lived to the age of 85, dying in 1695. He had an elder brother, whose name was Nicholas, a skilful painter, but who never rose to equality with him.

MIGNATRICE, LA, *Ital.*, a miniature painteress in 1770, the late Mrs. Corri, whose family name was Bicchelli, then a young and beautiful woman, a professed miniature painteress, and a brilliant and very pleasing singer at the Academie, or private concert of the nobility and gentry at Rome, where no females are allowed to appear on the stage, was best known by the title of La Mignatrice. After her marriage with her singing-master, Corri, she came with him to Edinburgh in 1772, to sing at the concerts in that city, where he was engaged to direct the concerts, and give instructions in music. They remained at Edinburgh till about the year 1787, when they removed to London, where Mrs. Corri, mother of the accomplished Mad. Duffec, died in 1802, much lamented by her family, friends, and all who had heard her sing in the early part of her life.

MIGNONETTE, in *Botany*. See RESEDA.

MIGNOT, STEPHEN, in *Biography*, a learned French ecclesiastic, a native of Paris, was born in the year 1698. He was brought up to the church, and was admitted to the degree of doctor by the faculty of the Sorbonne, and rendered himself eminent for his acquaintance with the sacred scriptures, the fathers, ecclesiastical history, and canon law. When upwards of sixty years of age, he was elected a member of the Royal Academy of Inscriptions and Belles Lettres. He died in the year 1771, leaving behind him numerous works, of which the following seem most worthy of notice: *viz.* "A Treatise on Commercial Loans," in four volumes; "The Rights of the State and of the Prince, with Reference to the Estates of the Clergy," in six volumes;

"The

"The History of the Contest between Henry II., and St. Thomas of Canterbury;" "The Reception of the Council of Trent, in Catholic Countries;" "A Paraphrase on the New Testament," in four volumes; "A Memoir relating to the Liberties of the Gallican Church."

MIGRATION, or TRANSMIGRATION, the passage or removal of any thing out of one state or place into another; particularly of colonies of people, birds, &c. into other countries.

The migration of the souls of men into other animals after death, is the great doctrine of the Pythagoreans, called the *metempsychosis*.

The migration of birds, as the swallow, quail, stork, crane, field-fare, woodcock, nightingale, and other birds of passage, is a very curious article in natural history, and furnishes a notable instance of the powerful instinct impressed by the Creator. Dr. Derham observes two things remarkable in this subject; the first, that these untaught, unthinking creatures, should know the proper times for their passage, when to come, and when to go; as also, that some should come when others go? No doubt, the temperature of the air, as to cold and heat, and their natural propensity to breed their young, are the great incentives to those creatures to change their habitation. But why should they at all change their habitations? and why is not some certain place to be found, in all the terraqueous globe, affording them convenient food and habitation all the year round?

The second, that they should know what way to steer their course, and whither to go. What instinct is it that moves a poor foolish bird to venture over vast tracts of land and sea? If it be said, that, by their high ascents up into the air, they can see across the seas; yet what should teach or persuade them, that another land is more proper for the purpose than this? that Britain, for instance, should afford them better accommodation than Egypt? than the Canaries? than Spain? or any other of the intermediate countries? *Physico-Theol.* p. 349.

Lud. de Beaufort remarks, that birds, in their migration, observe a wonderful order and polity: they fly in troops, and steer their course through vast unknown regions, without the compass. (*Cosmol. Divin.*) It is to be added, that the birds of passage are all peculiarly accommodated, by the structure of their parts, for long flights.

Naturalists are divided as to the places whither birds of passage retire when they leave us. Mr. Willughby thinks the swallows fly into Egypt and Ethiopia.

Olaus Magnus says, they lurk in holes, or under water; which is confirmed by Etmuller, who assures us, that he saw a bushel of them taken out of a frozen fish-pond, all hanging together, head to head, feet to feet, &c. in one cluster. (*Disert.* ii. c. 10.) Olaus adds, that this is a common thing in the northern countries; and that such a cluster being carried accidentally by some boys into a stove, the swallows, after thawing, began to fly about, but weakly, and only for a little time.

A farther confirmation of this account was given by Dr. Colas, a person very curious in such things, to the Royal Society. Speaking of the way of fishing in the northern parts, by breaking holes, and drawing their nets under the ice, he related, that he saw sixteen swallows so drawn out of the lake of Samrodt, and about thirty out of the king's great pond at Rosincilen; and that at Schlebitten, near a house of the earl of Dohna, he saw two swallows just come out of the waters that could scarcely stand, being very wet and weak, with their wings hanging on the ground. He added, that he had often observed the

swallows to be weak, for some days after their first appearance.

Some of our own countrymen have given credit to the submersion of swallows; and Klein patronises this doctrine in his *Hist. Av.* 205, 206. But they assign no reason, why these birds are capable of enduring so long a submersion without being suffocated, or without decaying in an element so unnatural to them; when we know that the otter, the cormorant, and the grebe soon perish if caught under ice, or entangled in nets; and it is well known, that these animals will continue much longer under water than any others to whom nature hath denied that particular structure of heart, necessary for a long residence beneath that element. Mr. John Hunter, having dissected many swallows, found nothing in them different from other birds as to the organs of respiration; whereas all those animals which he had dissected, of the class that sleep during winter, such as lizards, frogs, &c. had a very different conformation in those organs. He farther adds his opinion, that these animals breathe in their torpid state; and, as far as his experience reaches, he knows they do; and he, therefore, esteems it a very wild opinion, that terrestrial animals can remain any long time under water without drowning.

There is another more probable opinion, with respect to the disappearance of swallows, which has high antiquity to support it. Aristotle and Pliny assert, that these birds do not remove very far from their summer habitation, but winter in the hollows of rocks, and during that time lose their feathers. We have had many instances of some species of swallows having been discovered in a torpid state, on the cliffs of the Rhine, in old dry walls and sand-hills in Scotland, in the chalky cliffs of Suffex, in hollow trees, and lead mines, &c. These several places are supposed to be the lurking habitations of later hatches, or of those young birds that are incapable of distant migrations; where they generally continue insensible and rigid, though, like flies, they may sometimes be re-animated by an unseasonable hot day in the midst of winter. From these facts, it is reasonable to conclude, that, though one part of the swallow tribe migrates, others may have their winter-quarters nearer home. If it should be asked, why swallows alone are found in a torpid state, and not the many other species of soft-billed birds, which likewise disappear about the same time? the following reason, says Mr. Pennant, may be assigned. No birds are so much on the wing as swallows; none fly with so much rapidity and swiftness; none are obliged to such sudden and various evolutions in their flight; none are at such pains to take their prey; and none exert their voice more incessantly; whence they suffer a great expence of strength and spirits, and acquire such a texture of blood, as other animals do not experience; and become thus disposed to a more lasting repose than other birds. But notwithstanding this concession, it is most probable that swallows in general, as well as other birds, migrate from colder into warmer climates, in search of proper food, a sure asylum from man during the time of courtship, incubation, and nutrition, and a temperature of air suiting their constitutions.

The generality of birds that remain the winter with us have strong bills, or are enabled to feed on what they can find at that season; those which leave us have usually very slender bills, and their food is the insects of the fly kind; which disappearing towards the approach of winter, compel them to seek them in regions where they may be found; and the length of the wings of the generality of these birds, enables them to prey flying, if there be food for

MIGRATION.

them in their way, and to continue a long time on the wing without rest.

The various conjectures about the places to which they retire, are owing to want of ocular testimony; but if we consider the vast tracts of land yet unknown to us, we cannot doubt but there may be many places for them, in which we can have had no opportunities of finding them. But the most probable conjecture seems, that the places to which they retire lie probably in the same latitude in the southern hemisphere, as the places from whence they depart; where, the seasons reverting, they may enjoy the like agreeable temperature of the air. And, if these places are supposed to be divided from them by too large seas, why may not some other parts of the southern hemisphere, which are less distant, serve their turn?

This, certainly, seems much more reasonable than that they should remain on our side of the northern tropic, within a few degrees of which, at the winter solstice, it is so cold as frequently to produce snow; which, by dispersing such insects as birds that feed upon the wing subsist on, must make them perish, were they not to remove to those warmer climates where they may still find food. The swallows, as they cannot subsist so long in cold seasons as some other birds of passage, which feed, after the disappearance of flies in the air, on what insects they find in their recesses, visit us later, and depart from us sooner, than the rest. The nightingales, and some other birds, which leave us for the winter, are seen, sometimes, a month after the swallows; and from the whole it seems natural to infer, that the swallows pass the tropic of Cancer, though it is not yet known to what place they at length retire.

The manner of the birds of passage journeying to their southern abode may vary, according to the different structure of their bodies, and their power of supporting themselves in the air. Those birds with short wings, such as the redstart, blackcap, &c. though they are incapable of such long flights as the swallow, or of flying with so much celerity, yet may pass to less distant places, and by slower movements. Swallows and cuckoos may perform their passage in a very short time; but there is for them no necessity for speed, since every day's passage affords them an increase of warmth, and a continuance of food.

Providence, which has guided the defenceless animals in many other instances to the safest methods of performing their necessary works, may have instructed many of these birds which have shorter passages to make, or places to stop at by the way, to fly only in the night, that they may be secure from the birds of prey; and Mr. Catesby gives a proof that some species do so, from his own observation; for, lying on the deck of a sloop on the north side of Cuba, himself and the whole company heard successively, for three nights, flights of rice birds, which are easily distinguished from all other birds by their notes, and which were passing over their heads northerly; which is their direct way from Cuba, and the southern continent of America, from whence they get to Carolina, annually, about the time that rice begins to ripen, and from whence they return southward again, when it is gathered, and they are become fat.

That this is the case also with some species of swallows, has been proved beyond contradiction by M. Adanson, *Hist. de Senegal*, p. 67. We often observe them collected in innumerable flocks on churches, on rocks, and on trees, previous to their departure hence; and Mr. Collinson proves their return here, perhaps, in equal numbers, by two curious relations of undoubted credit; the one communicated to him

by Mr. Wright, master of a ship, and the other by the late sir Charles Wager; who both described to the same purpose what happened to each of them in their voyages. "Returning home," says sir Charles, "in the spring of the year, as I came into soundings in our channel, a great flock of swallows came and settled upon my rigging: every rope was covered; they hung on one another like a swarm of bees; the decks and carving were filled with them. They seemed almost famished and spent, and were only feathers and bones; but being recruited with a night's rest, took their flight in the morning." This apparent fatigue proves that they must have had a long journey, considering the amazing swiftness of these birds; so that in all probability they had crossed the Atlantic ocean, and were returning from the shores of Senegal, or other parts of Africa.

The short-winged birds are supposed little qualified for long flights, particularly the quail, which is a bird never seen long together on the wing, or making any long flights; its not doing this frequently is, however, no proof that it is not able to do it; nor does the structure of its body at all bespeak its inability; and Bellonius affirms, that he saw them in great flights passing over, and repassing, the Mediterranean sea, at the very seasons when they leave us, and they return again. The same instinct that directs these birds to depart to distant countries, doubtless also directs them to the shortest way, and sends them to the narrowest cuts, not the wider seas, to cross.

Among the birds of passage, we have some also which come to us in the autumn, at the time when the summer birds are leaving us; and go from us again in the spring at the times when these return: these, however, are only four kinds; the field-fare, the redwing, the woodcock, and the snipe; and of these the two last often continue with us through the summer, and breed; so that the two first seem the only kinds that certainly leave us at the approach of spring, retiring to more northern parts of the continent, where they live the summer, and breed; and, at the return of winter, are driven southerly from those frigid climes, in search of food, which there the ice and snow must deprive them of. There are many others also, particularly of the duck, or wading kind, that breed and make their summer abode in the desolate fenny parts of our island; and when the severity of our winters deprives them of their food, necessity forces them to retire towards the sea in numerous flights; where they find water unfrozen, and where they remain till the return of summer; but those cannot properly be called birds of passage.

It seems pretty evident from the whole, that the summer birds of passage leave us only in search of a more warm climate, and a greater plenty of food; both which advantages they procure to themselves by their alternate change of climate; but the migration of the winter birds of passage is not so easily accounted for, since there is no such apparent necessity for their leaving us, either on the score of food or climate. The place of the summer retirement of these birds is Sweden, and some other countries in that latitude; but as they would find those places too cold and destitute of provision, were they to hasten immediately to them on their departure from us, they journey along gradually, and prolong their passage through the more moderate countries of Germany and Poland; by which means they do not arrive at their northern habitations, where they are to pass their summer, and where they breed, till the severity of the cold is so far abated as to render it pleasing to them, and there is proper food for them; and when they revisit us the

following winter, their journey is performed in the same leisurely manner.

Sweden and the other countries whence they come to us, seem the proper home of these birds; since there they were bred; and the journey they take to us being only for a warmer climate, and plenty of food, it is no wonder that, when these benefits are to be expected again in their native place, they return to it.

The principal food of these birds, while with us, is the fruit of the white thorn, or haws, which hang on our hedges in winter in prodigious plenty; but where they breed, and seem to live most at ease, as in Sweden, &c. there are no haws, nor, indeed, in many of the countries through which they journey in their way; so that it is evident they change their food in their passage. And upon the whole it appears, that Providence has created birds, &c. with constitutions and inclinations adapted to their different degrees of heat and cold; which, to them, are most agreeable, and to which they will travel from places which to other animals might seem more agreeable: by this means no part of the globe is without its inhabitants. Phil. Trans. vol. xlv. p. 435, &c. vol. li. p. 459, &c. Pennant's British Zoology, vol. i. p. 406, &c. vol. ii. p. 709, &c.

MIGREEVO, in *Geography*, a town of Russia, in the government of Novgorod; 36 miles S. of Tcherepovetz.

MIGU, a town of Arabia, in the province of Oman; 140 miles S.W. of Julfar.

MIGUEL-ESTEVEAN, a town of Spain, in New Castile; 40 miles S. of Huete.

MIGUEL-Turria, a town of Spain, in New Castile; 4 miles S.E. of Ciudad Real.

MIGUEL, *St.*, a town of Mexico, in the province of Guatimala; 50 miles E. of Cuzcatlan.—Also, a town of S. America, in the kingdom of Grenada; 85 miles E. of Santa Fé de Bogota.—Also, a town of Spain, in the province of Seville, between the rivers Guadiana and Odier, near the coast of the Atlantic.—Also, a town of S. America, in Popayan; 90 miles E.S.E. of Païto.—Also, a town of Paraguay; 360 miles E. of Assumption.—Also, a town of Mexico, in the province of Nicaragua, on the N.W. coast of Amapalla bay; 100 miles S.E. of Leon. N. lat. 13° 35'. W. long. 88° 56'.—Also, a town of Mexico, in the province of Mechoacan; 80 miles N. of Mechoacan. N. lat. 21° 20'. W. long. 102° 26'.—Also, a town of S. America, in the province of Chiquitos.—Also, a town of S. America, in the province of Quito; 50 miles S.W. of Quito.—Also, a town of S. America, in the audience of Quito; 15 miles N.W. of St. Josef de Huales.—Also, a mission of Spanish monks in New Albion, near the coast of the Pacific ocean. N. lat. 31° 58'. E. long. 243° 42'.—Also, a small island in the N. Pacific ocean, called also "St. Bernardo," the most westerly of the range which forms the western boundary of the canal of St. Barbara. N. lat. 34°. E. long. 240° 3'.—Also, a river of Brasil, which runs into the Atlantic, S. lat. 10° 8'.—Also, a town of Brasil, in the government of St. Paul; 15 miles E. of St. Paul.—Also, a town of Congo, and capital of the province of Ovando; 150 miles S.S.E. of St. Salvador. S. lat. 7° 45'.—Also, a town of Mexico, in the province of Culiacan, on the Ciguatlan; 30 miles S.E. of Culiacan. N. lat. 24° 6'. W. long. 107° 52'.—Also, a town of New Mexico, in the province of Cinaloa; 70 miles W.N.W. of Cinaloa.—Also, a town of New Mexico; 60 miles S. of Santa Fé.

MIGUEL, *St.* See MADEIRA.

MIGUEL Archangel, *St.*, an island in the Pacific ocean, discovered by Quiros in the year 1606.

MIGUEL d'Ibarra, *St.*, a town of South America, and capital of a jurisdiction of the same name, in the audience of Quito, containing about 10,000 inhabitants. The houses are built of stone, and tiled. The suburbs are inhabited by Indians, in mean cottages. The parish church is a large, elegant, and well-ornamented building. Here are convents of Franciscans, Dominicans, and Fathers of Mercy, a college, and a nunnery of the order of the Conception; 45 miles N.N.E. of Quito. N. lat. 0° 25'. W. long. 77° 40'.—Also, a jurisdiction of S. America, in the government of New Grenada, and audience of Quito. The temperature of the air is different in all the villages of this jurisdiction, but generally warm, on account of their low situations. Most of the farms have plantations of sugar-canes, and mills for extracting the juice, of which they make large quantities of white sugar. Some farms are planted with fruits, common in a hot climate, and in others they only cultivate cotton, which is obtained in the greatest perfection. In those farms that are situated in a less hot part of this jurisdiction are sown maize, wheat, and barley. Here are also large multitudes of goats, but not many sheep. The Indians weave a considerable quantity of cloth and cotton. This jurisdiction has several mines of salt, which supply the countries that lie to the north of it. Near a village, called Mira, there is a great number of wild asses.

MIGUEL de Piura, *St.* See PIURA.

MIGUEL de Ribera, *St.*, a town of Peru, in the diocese of Arequipa; 62 miles W.S.W. of Arequipa.

MIGUEL de Tucuman, *St.*, a town of S. America, in the province of Tucuman; the see of a bishop, containing several monasteries. Its situation is elevated and agreeable, and in its vicinity are fertile fields, and several silver mines: some mules are bred; but the chief traffic is in a kind of cars, or covered waggons, which pass to Buenos Ayres and Jujuy, and which the inhabitants are enabled to build by their abundance of wood; 200 miles E. of Copiapo. S. lat. 27° 25'. W. long. 66° 30'.

MIGUEL Bay, *St.*, a bay on the E. coast of the island of Luçon. N. lat. 14° 12'. E. long. 123° 40'.

MIHALY, a town of Hungary; 10 miles N. of Zutmar.

MIHAU, a small island in the English Channel, near the coast of France; 15 miles W. from the island of Bas. N. lat. 48° 47'. W. long. 3° 30'.

MIHEL, a district of the archduchy of Austria, between the Danube and Bohemia.

MIHIEL, *St.*, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Commercy, situated on the Meuse, in a valley surrounded with mountains. It has six gates and three fauxbourgs. The place contains 5022, and the canton 14,010 inhabitants, on a territory of 255 kilometres, in 28 communes. N. lat. 48° 54'. E. long. 5° 37'.

MIHIRA, a name, in the Sanscrit, for the sun. See SURYA.

MIHLACK, in *Geography*, a town of Austria; 18 miles S.W. of Freystadt.

MIJARISIMA, one of the small Japanese islands. N. lat. 34° 10'. E. long. 139° 45'.

MIJAS, a town of Spain, in the province of Grenada; 10 miles N.E. of Marbella.

MIJASKA, a river of Russia, which runs into the Iser, in the government of Tobolsk.

MIJAVARA, a town of Japan, in the island of Nippon; 12 miles S. of Awasi.—Also, a town of Japan, in the island of Ximo; 28 miles S.E. of Ikua.

MIJO, a town of Peru, in the diocese of La Plata; 70 miles E.S.E. of Lipas.

MIIT DEMSIS, a town of Egypt, on the east branch of the Nile; 35 miles N. of Cairo.

MIIT Gera, a town of Egypt, on the east branch of the Nile; 12 miles S. of Mansfara.

MIIT Harun, a town of Egypt, on the east branch of the Nile; 2 miles N.W. of Miit Demsis.

MIIT el Koli, a town of Egypt, on the east branch of the Nile; 10 miles N.N.E. of Mansfara.

MIIT Laffi, a town of Egypt, on the east branch of the Nile, opposite to Miit Demsis.

MIIT Nafer, a town of Egypt, on the east branch of the Nile; 3 miles S. of Semennud.

MIIT Kamer, or Miit Ghamer, called by Savary *Mit Khamr*, a town of Egypt, on the east branch of the Nile; 24 miles N. of Cairo. This town, though small, is populous and commercial. The market places are narrow, and badly lighted; the streets are crooked and dirty. Here is a mosque, with a square tower, which seems to have served as a church for the Christians, before the Arabian conquest. Through all Egypt there is not a similar minaret; all being round, narrow, and lofty.

MIKALIDI, or MAARLICH, a town of Asiatic Turkey, in the province of Natolia, situated on a river, the ancient Rhyndus, which runs into the sea of Marmora. It has a port about two miles from the town, whence they send silk, wool, grain, and fruit to Smyrna, Constantinople, &c.; 35 miles W. of Bursa. N. lat. 40° 10'. E. long. 28° 22'.

MIKANIA, in *Botany*, a genus separated by Willdenow from the *CACALIA* and *EUPATORIUM* of Linnæus; see those articles; and named by him in honour of professor Joseph Mikan of Prague, of whose botanical performances we find nothing mentioned, except a mere catalogue of plants, an epitome of the 13th edition of the Linnæan *Systema Vegetabilium*, with some new species of Jacquin superadded, published at Prague in 1776; an octavo of 403 pages.—Willd. Sp. Pl. v. 3. 1742.—Clafs and order, *Syngenesia Polygamia-aqualis*. Nat. Ord. *Compositæ discoideæ*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* oblong, simple, of from four to six erect, equal, oblong, channelled, unarmed, permanent scales. *Cor.* compound, uniform, discoid; florets mostly equal in number to the scales of the calyx, all uniform, perfect, fertile, monopetalous, funnel-shaped, with a regular, four or five-cleft, spreading border. *Stam.* Filaments five, capillary, short; anthers united into a cylindrical tube. *Pist.* Germen minute; style thread-shaped, mostly rather longer than the corolla, deeply divided; stigmas slender, spreading. *Peric.* none, except the permanent, somewhat expanded calyx. *Seeds* solitary to each floret, oblong, angular; down sessile, simple, longer than the calyx. *Receptacle* small, naked.

Eff. Ch. Receptacle naked. Calyx of from four to six equal leaves, containing as many florets. Seed-down simple, sessile.

Section 1. *Stem climbing.*

1. *M. Houstonis*. Willd. n. 1. (*Eupatorium Houstonis*; Linn. Sp. Pl. 1172. Swartz. Obf. 300.)—Stem twining. Leaves ovate, entire. Flowers spiked.—Native of bushy places at Vera Cruz. *Houston*. In Jamaica, but rare. Swartz. The stem is twining, shrubby, round, smooth, with widely spreading branches. Leaves opposite, stalked, ovate, pointed, entire, ribbed, shining. Spikes opposite, spreading almost horizontally, many-flowered. Flowers minute, white, inodorous. Calyx of four scales. Florets four.

2. *M. hastata*. Willd. n. 2. (*Eupatorium hastatum*; Linn. Sp. Pl. 1172. Swartz. Obf. 299. Kleinia? scandens; Browne Jam. 316. t. 34. f. 3.)—Stem twining.

Leaves hastate, somewhat heart-shaped, acute, slightly toothed, smooth. Flowers spiked.—Native of thickets on the hills of Jamaica. Stem shrubby, climbing, round, striated, purplish, slightly downy. Leaves opposite, hastate, acutely pointed at each lobe, from one to near three inches long, three-ribbed, smooth, except a slight downiness on the ribs or veins; heart-shaped at the base; obscurely toothed or serrated at the margin. Footstalks about as long as the leaves, sometimes much shorter, slender. Spikes axillary and terminal, about the ends of the branches, downy, bracteate, near two inches long, obscurely whorled. Flowers usually four in a whorl, white, smelling like *Cacalia suaveolens*. The whole plant has a bitter taste. Sw.

3. *M. scandens*. Willd. n. 3. (*Eupatorium scandens*; Linn. Sp. Pl. 1171. Jacq. Ic. Rar. v. 1. t. 169. *Conyza scandens*, folani folio anguloso; Plum. Ic. 86. t. 99?)—Stem twining. Leaves heart-shaped, taper-pointed, wavy and toothed; lobes spreading. Flowers corymbose.—Native of Virginia, in a watery soil. This was introduced into the English gardens about 100 years ago, and is a hardy perennial, flowering in August and September, but of no remarkable beauty. The stem is rather herbaceous than shrubby, climbing, smooth, or downy. Leaves on long stalks, one and a half inch long, roughish, veiny, three-ribbed at the base. Flowers white, in axillary, stalked, leafy, more or less compound corymbs. Seed-down tawny; not white, as mentioned by Willdenow. Florets four.

4. *M. volubilis*. Willd. n. 4. (*Eupatorium volubile*; Vahl. Symb. v. 3. 93. *E. cordatum*; Burm. Ind. 176. t. 58. f. 2.)—Stem twining. Leaves heart-shaped, crenate, acute, lobes rounded, approximated. Corymbs panicked.—Native of the East Indies. The stem in our's is very nearly smooth, much less downy than in the last. Willdenow mentions the reverse. Leaves much larger, exactly heart-shaped, acute, nearly smooth, bluntly crenate; occasionally entire, as figured by Burmann. Corymbs compound, on long stalks. Seed-down bluish-coloured, or purplish.

5. *M. denticulata*. Willd. n. 5. (*Eupatorium denticulatum*; Vahl. Symb. v. 3. 93.)—"Stem climbing, angular. Leaves heart-shaped, bluntish, finely toothed, rough. Flowers corymbose."—Native of Surinam. "Branches with five prominent angles. Leaves two inches long, stalked; paler and slightly downy beneath; sometimes entire. Florets and calyx-scales four. Seed-down purplish." Of this we have seen neither specimen nor figure.

6. *M. tomentosa*. Willd. n. 6. (*Eupatorium tomentosum*; Lamarck Dict. v. 4. 410.)—Stem twining. Leaves alternate, heart-shaped, finely toothed, somewhat angulated, cottony beneath; the upper ones ovate. Spikes panicked.—Native of the Isle de Bourbon. One of Commerlon's specimens was given by Thouin to Linnæus. It is said to have the scent of lilac. The stem is very long, slender, twining, round, cottony when young. Leaves alternate, stalked; smooth, or slightly cottony, above; clothed with snow-white dense pubescence, like a white poplar, beneath. Spikes of flowers numerous, alternate, composing axillary leafy panicles. Calyx smooth. Seed-down white.

7. *M. amara*. Willd. n. 7. (*Eupatorium amarum*; Vahl. Symb. v. 3. 93. *E. parviflorum*; Aubl. Guian. v. 2. 797. t. 315.)—Stem twining, roughish. Leaves ovate, entire; rough beneath. Flowers corymbose. Bractæas spatulate, at the base of the smooth calyx.—Native of the banks of rivers in Guiana, flowering in August. Communicated by E. Rudge, Esq. The stems are ten feet long, branched, twining, round, rough with short, dense, rigid pubescence. Leaves opposite, stalked, three inches long; nearly smooth above; rough and harsh beneath. Flowers in

in corymbose, leafy, axillary panicles, three together sessile at the end of each partial stalk, with two or three short, spatulate, stalked, leafy bractlets. Florets and calyx-scales four. When wounded, the stem and branches discharge a yellowish, viscid, aromatic fluid.

8. *M. latifolia*.—Stem twining, smooth. Leaves ovate, taper-pointed, nearly entire, smooth. Flowers corymbose. Bractlets lanceolate, at the base of the roughish calyx.—Native of the island of St. Lucia. Very near the last, but differing in the above characters. The leaves are dark green above, and very smooth; pale, scarcely roughish to the touch, beneath. Inflorescence as in *M. amara*, but the bractlets are much smaller, sessile, lanceolate or elliptical, minutely roughish. Calyx also roughish. Florets, and rufous down of the seed, half as long again as the calyx; whereas in the last species they are much shorter, and concealed within it.

9. *M. chenopodiifolia*. Willd. n. 8.—“Stem twining. Leaves ovate, somewhat triangular, pointed, wavy, five-ribbed, smooth. Flowers corymbose.”—Native of Sierra Leone. Stem with smooth striated branches, apparently climbing. Leaves opposite, stalked, triangular-ovate, slightly hastate, smooth on both sides. Corymbis dense, stalked, terminal. Calyx smooth, of four scales, with as many florets. Down reddish. Willd.

10. *M. auriculata*. Willd. n. 9. (*Eupatorium auriculatum*; Lamarck Dict. v. 2. 411. *E. scandens*; Thunb. Prodr. 142?)—Stem twining, angular, smooth. Leaves alternate, triangular, somewhat hastate, toothed, smooth. Stipulas rounded. Flowers corymbose.—Gathered by Sonnerat at the Cape of Good Hope; and Willdenow well conjectures that it is probably the *E. scandens* of Thunberg, with whose short definition it seems to agree. The stem has many angles, and is much branched, twining and zigzag. Leaves small, with a pair of clasping stipulas at the base of their stalk, and sometimes a pair of similar auricles. Calyx of five or six scales, with as many florets. Lamarck.

11. *M. stipulacea*. Willd. n. 10. (*Eupatorium stipulaceum*; Vahl. Symb. v. 3. 94.)—Stem twining, round, smooth. Leaves opposite, hastate, acute, somewhat toothed, smooth. Stipulas oblong. Flowers corymbose.—Gathered by Commerçon in Brazil. Stem twining, slender, finely striated. Leaves stalked, much like those of some hastate *Chenopodium*; rather glaucous, and obscurely downy, beneath. Stipulas recurved, small, oblong, acute. Flowers in many axillary, opposite, stalked, often compound corymbs. Calyx roughish at the base, membranous upward, of four scales, with as many florets. Down purplish, rough, projecting, with the florets, much beyond the calyx.

12. *M. rubiginosa*. (*Cacalia cordifolia* varietas, foliis integris; Linn. Suppl. 352.)—Stem twining, downy. Leaves opposite, heart-shaped, pointed, wavy, finely downy. Panicles axillary, cymose. Bractlets spatulate. Native of South America? Of this we have seen but an imperfect specimen in the Linnæan herbarium, on which there is no mark to indicate its native country. By its resemblance to many of the foregoing species only, can we judge of its being a climber; for we have but an inch and a half of the stem, with a pair of opposite stalked leaves, each two inches long, with an axillary stalked corymbose panicle, accompanied by a pair of small leaves, to each. Every part is clothed with extremely short, dense, soft, rusty, velvet-like pubescence. The surface of the leaves, on both sides, sparkles with excessively minute golden resinous dots. Flowers not very numerous. Bractlets as long as the calyx, spatulate or obovate, obtuse, with or without a small point,

and tapering at their base. Scales of the calyx very much like them in shape and size, and both are equally downy externally. Seed-down reddish, scarcely extending beyond the calyx. This is certainly very distinct from the following, with which the younger Linnæus, who found the specimen here described in his father's herbarium, marked *Eupatorium*, confounded it.

13. *M. cordifolia*. Willd. n. 11. (*Cacalia cordifolia*; Linn. Suppl. 351.)—Stem twining? angular, roughish. Leaves opposite, heart-shaped, pointed, toothed, rough. Panicles axillary? cymose, leafy. Bractlets ovate, pointed, shorter than the calyx.—Gathered by Mutis in New Spain, South America. By its near agreement with the last species, we judge this also to be a climbing plant. The Linnæan specimen consists of only a large compound corymbose branch of flowers, accompanied by small opposite leaves, as usual in this section of the genus, but whether it may have been axillary or terminal, we cannot determine. With it are two separate leaves, not unlike those of a *Helianthus*, each three inches long, of a very broad heart-shaped figure, oblique or unequal, minutely but distantly toothed, with a short taper point. They are rough on both sides, with minute harsh pale bristles, their ribs, which are three in the middle, and two at each side, clothed with rusty down. Footstalks two inches long, or more, rusty. Panicle many-flowered, with roughish angular stalks. Bractlets scattered, stalked, gradually smaller upwards, ovate, pointed, entire, bristly at the edges; those which are close to the flowers elliptic, shorter than the calyx. Scales of the calyx four, elliptic-lanceolate, acute, ribbed, concave; the two outermost roughish, especially upward; the innermost only being smooth as described in the *Supplementum*. Seed-down reddish, rough, longer than the calyx, as are also the florets.

14. *M. laurifolia*. Willd. n. 12. (*Cacalia laurifolia*; Linn. Suppl. 351.)—Stem twining? Leaves opposite, elliptic-ovate, triple-ribbed, very smooth and shining. Panicles dense, terminal, downy.—Native of Mexico. Mutis. This has all the appearance of a climbing shrub, though Willdenow could have no reason, from the Linnæan description, to suspect it. The branches are much twisted, forked, round, smooth, leafy at their extremities. Leaves one and a half or two inches long, near an inch wide, almost elliptical, obtuse, entire, slightly revolute, rigid, smooth; varnished as it were on the upper side; thickly dotted beneath; their lateral ribs springing from the middle one at a good distance from the base, besides a pair at the very bottom. Panicle three inches long, dense obtuse, with hairy corymbose stalks. Bractlets small, oblong. Scales of the calyx four, linear, hairy, (by no means smooth as in the *Suppl.*), rather dilated and feathery at the tips. Seeds furrowed, angular, rough, nearly as long as the calyx. Florets and down much longer. Styles greatly protruding, with long, narrow, purplish stigmas.

Section 2. *Stem erect*.

15. *M. meliffolia*. Willd. n. 13. (*Eupatorium meliffolium*; Lamarck. Dict. v. 2. 411.)—Stem erect. Leaves opposite, ovate, crenate, sessile, downy beneath. Flowers corymbose, terminal.—Gathered by Dombey in Peru. Stem about two feet high, round, slightly downy, panicked above. Leaves sessile, and even somewhat embracing the stem, oval, coarsely crenate, green, about two inches or more in length, and one inch and a half wide. Flowers purplish. Calyx of five straight scales. Florets five. Down rough.

16. *M. saturifolia*. Willd. n. 14. (*Eupatorium saturifolium*; Lamarck. Dict. v. 2. 411.)—Stem erect, branched. Leaves opposite or scattered, linear, obtuse, entire,

entire, downy. Flowers corymbose.—Gathered by Commerfon at Monte Video. The *stem* feems fcarcely shrubby, round, alternately branched, downy, leafy. *Leaves* mostly fattered, the lower ones only being often oppofite, feffile, linear, or linear-lanceolate, obtufe, nearly or quite entire, tapering at the bafe, thickly dotted, minutely hairy; paler beneath. *Flowers* large, purple, a few together in tufts on terminal, corymbose, downy ftalks. *Calyx* downy, but half the length of the florets and rough brownifh *feed-down*. *Corolla* five-cleft, flightly hairy.

Commerfon gathered at the fame place a fender variety, with much fmaller *leaves*, and only one or two *flowers* at the top of a few of the branches. We agree with him that, though very different in appearance, the fpecimen difplays no diftinctive fpecific character. Indeed we have an intermediate variety, which leaves the matter without any uncertainty. We make no apology for correcting the barbarous conftruction of the fpecific names of this and the foregoing. S.

MIKELSBURG, in *Geography*, a fortified town of Tranfylvania, with a depôt of arms for the principality; 6 miles S.E. of Hermanftadt.

MIKLOS, ST., a town of Tranfylvania; 12 miles N.N.W. of Medies.

MIKLOSVAR, a town of Tranfylvania, on the river Alaut; 16 miles N. of Cronftadt.

MIKOLAIOW, a town of Auftrian Poland, in Galicia; 28 miles S.S.W. of Lemberg.—Alfo, a town of Poland, in Volhynia; 24 miles W. of Lucko.

MIKULINOZE, a town of Poland, in Podolia; 56 miles N.N.W. of Kaminiac.

MILA, a town of Thibet; 222 miles S.W. of Latac.—Alfo, a town of Tunis; 30 miles S. of Conftantina.

MILAGRO, a town of Spain, in the province of Aragon, at the confluence of the Arga and Aragon; 5 miles E. of Calahorra.

MILAN, *Duchy of*, a country of Italy, bounded on the north by the Grifons, on the east by the Venetian ftates, on the fouth by the ftates of Piedmont and Parma, and on the weft by Piedmont and Savoy. Its greateft breadth from north to fouth is upwards of 100 miles, and its greateft length from east to weft 108 miles. This fertile duchy is faid to contain, on 2432 fquare miles, a population of 1,116,850 perfons; and it has formerly produced to the king of Spain a revenue of above two millions of dollars. According to Mr. Young's ftatement, the foil is chiefly ftrong loam, or loamy fand; and the climate has a fingular circumftance belonging to it, that the northern mountainous tracts are mild and warm, but the plains are cold. Orange and lemon trees flourish in the open air, on the weftern fides of the lake of Como, though bounded by the high Alps, which to the north are covered with perpetual fnow; while, in the plain of Lombardy, even to the Apennines, thefe trees require fhelter. The Boromean ifles alfo, in the Lago Maggiore, are covered with thefe delicate trees. The lands in this duchy are mostly enclosed; but its agriculture can never prosper, while the prefent fyftem continues, which is that of the landlord's paying taxes and repairs, and the tenant's providing cattle, implements, and feed, and then their dividing the produce between them. For the irrigation of the country, they have canals, fubfifting as early as the 11th century, fome of which are more than 30 miles long, and nearly 52 feet wide. The arable lands produce the ufual kinds of grain and fruits, and the paftures are excellent, affording means for breeding cattle in abundance, and for making cheefe that has been every where held in eftimation. The wine is good, and the mulberry trees, for

the culture of filk, are numerous. Its fheep are but few and bad. Its mines have not been much explored: however, there are fome of copper and lead above the lake of Como, and the mountains; and the Boromean ifles prefent frefh-coloured granite, and lapis ollaris is plentiful near Como. In this duchy are manufactures of wool and filk, though its filk is not equal to that of Piedmont; and it has numerous workmen in gold, filver, embroidery, and fteel, as well as in crystal, agate, aventurine, and other ftones. The trade of the Milanefe is confiderable; but its imports generally exceed its exports. Its ftuffs are moftly confumed at home; its filks, ftockings, gloves, and handkerchiefs, are exported.

After the fall of the kingdom of Lombardy, Milan became fubject to the emperors of the Weft. After the contefts between the emperors and the popes, it loft its form of a republic, and became fubject to the archbifhop: in 1277, Otto Vifconti, the archbifhop, was declared lord of Milan. His family long poffeffed this rich principality. After two or three changes it was feized, in 1535, by Charles V., as a fief of the empire, and he gave it to his fon Philip; whofe fucceffors, as kings of Spain, retained the Milanefe till the year 1706, when it became an appanage of Auflria, though a confiderable part of it had been transferred to the houfe of Sardinia. Its revenues have been lately eftimated at about 300,000*l*. When the Cifalpine republic was formed, the Milanefe was divided into four departments, *viz* Olona, Verbano, Lario, and Delle Montagna. Milan was appointed the capital of the whole republic; and the fame eftablifhment ftill refpects the kingdom of Italy.

MILAN, a city, and capital of the lately eftablifhed kingdom of Italy, and, before the revolution in France, the capital of the duchy above defcribed. Including its gardens, it is faid to be ten miles in circumference, and it is chiefly defended by a wall and rampart, together with a citadel having fix bafions at fome diftance, fo that it has been reputed a ftrong place. It has fome ftraight and broad ftreets, among many that are narrow and crooked; but its paper windows, or thofe of glafs and paper intermixed, give it a mean appearance. It has 12 gates, 230 churches, 90 convents, 100 religious fraternities, 120 fchools, and about 120,000 inhabitants. It is the fee of an archbifhop, and its nobles are numerous. Its cathedral is a large but irregular building, conftructed of marble, and ornamented with marble ftatues: its treafury, among other valuable articles, contains an invaluable coffin of rock-crystal, in which are deposited the remains of St. Charles Boromeo, cardinal and archbifhop of Milan. The chief church for antiquities is that of St. Ambrofe; and the Ambrofian college, in the centre of the town, was founded by Frederic Boromeo, and has fixteen profefors, who communicate their inftructions gratis. The fine library which he began was finifhed by cardinal Gelbert Boromeo, and is faid to contain more than 40,000 printed volumes, and fome thoufands of MSS. In this college are alfo an academy of painting, and a mufem. The feminary for fciences, where ftudents are both taught and maintained, and the college of the nobles, are ftately buildings, but inferior to the Helvetian college, founded for a number of Swifs. Here is alfo a mathematical academy. The great hofpital is a fine building, and liberally endowed by duke Francis Sforza IV.; and its income is faid to be between 90 and 100,000 rix-dollars. This hofpital, which has feveral others dependent upon it, admits not only fick perfons, but alfo foundlings and lunatics. The large lazaretto is only ufed in time of contagion. Among the civil buildings is the old and fpacious regency-houfe, and the new and ftately town-houfe, where is an equeftrian ftatue of Philip II.

This city was founded by the Gauls about 584 years B.C.; but has undergone many sieges, and particularly that by the emperor Frederic I. in 1162, who, after a siege of seven months, destroyed the gates, ramparts, and edifices, leaving only a few churches, and sowed salt on the ruins. However, it recovered from these disasters; and it still maintains many manufacturers and artisans; and by means of several rivers and canals, carries on a considerable trade. In 1800 it was taken by Bonaparte; and when the Cisalpine republic was established, it became the capital of the department of Olona and of the whole republic, and it maintains the same rank in the kingdom of Italy; 132 miles W. of Venice, 65 N. of Genoa. N. lat. 45° 26'. E. long. 9° 11'.

MILAPOUR, a town of Hindoostan, in Mysore; 22 miles E. of Colar.

MILASA, or MARMARA, a town of Asiatic Turkey, in Naxos; anciently called Mylassa. In this place are the remains of three temples, and of a column, called Meander's pillar; 16 miles S.W. of Mogla. N. lat. 37°. E. long. 27° 50'.

MILATIA, a town of Poland, in Volhynia; 44 miles S.W. of Lucko.

MILAVARAM, a town of Hindoostan, in the circle of Condapilly; 14 miles N. of Condapilly.

MILAY, a town of Bohemia, in the circle of Leitmeritz; 16 miles S. of Leitmeritz.

MILAZZO, CAPE, a cape of Spain, on the W. coast of Galicia. N. lat. 38° 20'. E. long. 15° 23'.

MILBANK'S SOUND, an inlet in the North Pacific ocean, between Point Day and Cape Swaine.

MILBORNE-PORT, a borough-town and parish in the hundred of Honethorne, and county of Somerset, England. The former stands on one of the branches of the river Parret, at the distance of ten miles from Ilchester, and two from Sherborne, in Dorsetshire. This place is of great antiquity, having been a borough of considerable importance prior to the Conquest; after which event it lost much of its consequence, though it retained all its former privileges till the reign of Edward III., by whom it was deprived of the right of sending members to parliament. In the reign of Charles I., however, that franchise was restored; and it now returns two representatives, who are chosen by the inhabitants paying scot and lot. The government of this town is vested in the owners of nine bailiwicks, who are lords thereof, assisted by two deputy bailiffs, two constables, and several other inferior officers. Besides these there is likewise an association within the borough, consisting of nine persons, two stewards, and seven assistants, who are privileged to hold property in their corporate capacity, for the benefit of the poor.

The buildings of Milborne-Port are chiefly disposed in four streets, the principal one of which, called High Street, is of considerable width, but extremely irregular. In this street stands the guild-hall, an ancient edifice, having a door-case partly of Saxon and partly of Norman architecture. The old market-house is now converted into warehouses, and there is no regular market now held. The church, an ancient structure, built in the form of a cross, is surmounted by a very massive quadrangular tower, supported by two pointed and two semi-circular arches. In the north aisle are several handsome monuments, in honour of the Medlycot family. On opening a plot of ground near the church-yard, for the purpose of building, sixty bodies of men and women were discovered, arranged in regular rows, which, from the want of coffins, are supposed to have been buried at the time of the great plague.

Besides the borough, the parish of Milborne-Port contains two considerable villages, called Kingsburg-Regis and

Milborne-Wyke. The former has land-tax and parochial assessments peculiar to itself; and there is held here an annual court-baron, wherein the lords' rents are paid, presentments made, and a constable, tything-man, and hayward appointed. The lands in this vicinity are mostly arable, and in a high state of cultivation and fertility.

According to the parliamentary returns of 1801, the total population of this parish amounted to 953 persons, 440 males and 513 females; of which number 577 were engaged in different branches of trade, and 200 in agriculture. Col-linson's History and Antiquities of Somersetshire, vol. ii. 3 vols. 4to. Maton's Western Counties, vol. ii. 8vo.

MILBOURN, LUKE, in *Biography*, an English divine, was the son of Mr. Luke Milbourn, a nonconformist minister, who was ejected from the living of Wroxhall, in Warwickshire, in 1662, and died at Newington in 1667. His son received a good education, became master of arts, and obtained the rectory of St. Ethelburg in London. He published sermons and theological tracts, 2 vols. 8vo.; a poetical version of the Psalms; and several poems, for which Pope gives him a place in the *Dunciad*. He died in 1720.

MILICE, in *Geography*, a town of Poland, in Volhynia; 34 miles N.N.W. of Lucko.

MILDEN. See *MOUDON*.

MILDENHALL, a market-town and parish in the hundred of Lackford, and county of Suffolk, England, is situated on the river Lark, at the distance of 12 miles from Bury, and 70 from London. The parish is of great extent, from the dispersed arrangement of its streets, which in fact form a series of little villages. That part of the town called the Borough, or High-town Mildenhall, is its principal division, and contains both the church and the manor-house. The former is a very large and handsome structure, and has a rich roof of carved work, and a lofty tower, and contains a variety of monuments in honour of the family of the Norths. This church is supposed to be of very ancient foundation, and is much admired for its architecture. The manor-house, likewise an old edifice, but greatly altered and repaired of late years, constitutes the family residence of sir Thomas Charles Bunbury, bart., who was one of the representatives for the county in the last parliament. The ancient mansion of the Norths here has a gallery in front, extending the whole length of the house. This town was much injured by a fire, which broke out on the 17th of May 1507, and in a few hours consumed 37 dwelling houses, besides barns, stables, and other appurtenances.

Mildenhall is the chief town of the hundred, and, according to the parliamentary returns of 1801, contained a population of 2283 persons, 1095 males and 1188 females; of which number 390 were returned as engaged in agriculture, and 147 in different branches of trade and manufactures. The petty sessions are held here, as well as a weekly market on Friday. This town has furnished London with two lord mayors, Henry Barton and William Gregory; the former of whom held that honourable office in 1428, and the latter in 1451.

The vicinity of Mildenhall presents to the view a flat, open country, wholly devoid of any interesting features, except a few family-seats, the chief of which are Ickworth, Rushbrook, and Culford. Ickworth is distinguished for its noble park, which is no less than ten miles in circumference. Kirby's Suffolk Traveller, 8vo. 1764. Carlisle's Topographical Dictionary.

MILDEW, in *Agriculture*, a disease frequently destructive to corn, pulse, and other crops.

MILDEW.

M. Duhamel states, that "it attacks the blades and stems of corn, which it covers with a powder of the colour of rust of iron, when at the height of their vegetation. This substance does not adhere strongly to the blades; for he has seen the hair of white spaniels full of this powder, after they have run through a field attacked with this disease. It is likewise known, that if the infected wheat is washed by a plentiful rain, the rust disappears almost entirely, and the grain suffers little from it. The French give it the name of rust, from the colour of the powder, and it seems to be the same distemper, which the Roman writers term *rubigo*. He adds, that the cause of this distemper is usually said to be dry gloomy weather, happening while the corn is at the height of its vegetation; and in effect, he has many times observed, that when a hot sun has succeeded such dry hazy weather, corn was rusted within a few days afterwards. It is not common in clear, dry, hot years: but when the spring is wet, the finest fields of wheat run great hazard of being destroyed by it, which generally appears upon the breaking out of the sun in the morning, after close and sultry weather, during which there has not been any dew. The rusty powder then gathers upon the blades in such quantities as to cover the earth around. M. de Chateauxvieux cut off the mildewed blades, and found the trial answer: the same plants produced new blades, and throve much better than those on which this operation had not been performed, but this cannot be done, except when the corn is very young. It is very fatal; as the finest wheat is suddenly brought almost to nothing, when it is entirely attacked with it.

"If it attacks the plants while they are young, and before their stems begin to rise, the mischief is sometimes not very great, provided there comes on a season favourable to their farther growth. In this case they are only weakened, as if they had been fed or mowed. They shoot out anew, and produce ears; though their straw is shorter, and those ears are smaller than they would otherwise have been. But if both blades and stalks are mildewed at the same time, the further growth of the plant is stopt and the grain gets scarcely any more nourishment; so that the crop is exceedingly diminished."

It was observed that, "in the autumns of 1753 and 1754, when the corn was rusted, the second crop of hay was so likewise. The grass turned from a fine green to the ugly rusty colour of the corn: it was covered with the same kind of powder, and its quantity diminished sensibly every day; and as the whole of a field of corn is not usually affected at the same time, so this distemper extended only to some parts of the meadow."

"The cause of this distemper is undoubtedly the same in corn and in grass; but its effect is not exactly similar. It may destroy annual plants, such as corn, entirely; but in perennials, like grass, it destroys only the leaves or blades. May not the preservation of these last be owing to the taking off those leaves or blades, when they are cut for hay? But this is only conjecture; for it is confessed, that he has not yet made any observation on this head.

It may be noticed that these causes are far from being satisfactory; but it is a difficult enquiry, and one which has lately, especially by botanical writers, been considered in a very different point of view. The facts that have been lately presented to the public on this subject, shew that it is not much influenced by soil, situation, or the nature of the climate. The answers that have been given to different enquiries on this matter, may probably lead to some useful conclusions. On this subject Mr. Chatterton states, in the 44th volume of the *Annals of Agriculture*, that "1. From what he has seen, and heard from others, it appears that all soils in

his neighbourhood, Yorkshire, have had mildewed crops upon them; but as far as he can judge, the heavy clays, which had a good fallow, have escaped the best." But it is afterwards observed, that though "this was the case in some parishes about him, yet, for the most part, in the East Riding they suffered more severely than any others, upon whatever soil: the reason seems to be, that in general they were more luxuriant, and laid some time before they were ripe. And he also understands that crops on all soils (where thrown down) were the most affected with the disease, if it may be so called; from which it should seem not to arise from any previous cause, such as the season of sowing, the difference of seed or manure, &c., but from some uncommon bad state of the atmosphere not long before harvest, which most affected the straw that rested in an horizontal position. He has further learned from a person, who says he cut a field of wheat, which was affected with the mildew, while in a green state (but not before the grain had arrived at a good degree of solidity), and that it is much better corn than others which were suffered to stand till ripe. On the sea side, there appeared just before reaping time, but little (in comparison) damaged in the vicinity of the beach; yet two or three miles from the sea, it seemed as bad as in other places at a greater distance; and he has known, when all the gardens have been ruined by frosts in the spring, at a distance from the sea, while those upon the edge of the cliff have not suffered at all."

And it is afterwards observed, 2. That "both early and late sown crops have suffered; but which have suffered most is hard to ascertain.

3. "That it is not easy to say, what situations have been most affected with mildew; it may be said all are nearly the same: he has observed upon the wolds in Yorkshire a great deal that would not pay for thrashing; so bad was it, that hens would prefer shelling oats for their broods, rather than pick up the wheat that lay about them; and in the low lands at the foot of the wolds, both on strong and light soils, much of the straw appeared black in many fields.

4. "It is supposed, that both thick and thin sown crops have been equally affected.

5. "He imagines, from what he has heard, that old or new seed had no effect.

6. "That this subject seems to be enveloped in mystery, as several persons in this neighbourhood have had two fields of wheat adjoining each other—situations and soils alike—management similar in every respect, only not all sown at the same time—yet both may be said to have been sown in good season: the one field entirely escaped the mildew, the other so much damaged, that it was not worth thrashing. Something might here be advanced on earlier or later sowing; but, perhaps, not any thing that could in the least guide the farmer in his future management, as seasons are so various.

7. "That the crops of both kinds of land have suffered severely, and in some places both have escaped; without a general survey, it is hard to decide.

8. "But he has not heard of any difference in crops arising from difference of manure; he has not, however, inquired much into this matter.

9. "He has not heard of the different kinds of seed being different in regard to mildew."

And the results of the inquiries of another writer in the same work are, that in Lincolnshire the soils most liable to it, are 1. "In general light, loamy, and rich ones. 2. Late sown crops. 3. That there is very little difference in situations, but if any, high ones have the advantage. 4. That the quantity of seed has little or no advantage; but drilling the

the seed has, on account of the greater and uniform depth. 5. That he never knew any difference between old and new seed, with regard to the mildew in wheat. 6. That he attributes the sole cause of the mildew in wheat to mild winters, and to the inflammation of oxygen gas at the eye of harvest. 7. That fallow crops on strong clay soils have been least affected. 8. That all kinds of manures dispose wheat to mildew in such seasons; lime in some degree prevents it. 9. That he has no knowledge of the barberry having any effect at all upon wheat. 10. That no kind of wheat that he knows of, is exempted wholly from the mildew. 11. That early cutting from early sowing, has the greatest advantage, but not before the milk in the grain is completely coagulated."

It is also stated, 1. "That in Staffordshire Dr. Lewis made some observations on the disease, and means of preventing it.

2. "That he does not think it of consequence to the question, at what time of the season wheat is sown, because the period of the approach of the mildew cannot be even conjectured, as it has ever been variable. In this neighbourhood it so happened, that the wheat which was sown in September and November 1803, suffered in general more from the mildew, than that of October.

3. "That high and consequently ventilated situations are doubtless more likely to receive a remedy to the disease, than low and sheltered ones; but he believes they were all equally affected.

4. "That it has not appeared, that any particular mode of sowing has been a preservative to the crop. That drilled corn, rather than broad-cast, is more easily cured, must be granted, if the drill be wide enough to admit of a person to set his foot between the rows, because with a long pole, which, by means of straps, might be suspended from his shoulders across his breast to a proper height, he might brush off the greater part of the dew, as he walked up and down, to the extent of three yards on each hand: and indeed, in a field of broad-cast, the same means might economically be pursued, as it would surely answer to destroy a part of the diseased grain, which if left to itself would be good for but little, to save the remainder. Those crops which were strong and thick, suffered, in general, considerably more than those which were thinner. 5. That it does not appear to him, that either new or old seed is of consequence to the question. 6. That the cause exists in the atmosphere, as he has already said. He has no doubt, and he thinks, we may fairly conclude its being of that kind, which is termed phlogisticated; that particularly in the summer it is so loaded with the putrid effluvia of animal and vegetable substances, as to be incapable of attaining the height necessary to undergo the chemical process of purification by the action of the vitriolic, nitric, and muriatic particles with which the air of the higher regions is charged; and that, therefore, it descends in that undepurated and unwholesome fluid which we term mildew. It has frequently been observed, that in those seasons, which have been preceded by a severe winter, the air is more pure than when the winter has been mild; but whether the mildew has been more prevalent after a hard or temperate winter, has not yet made a part of his observation. Late frosts and fogs are generally reckoned inimical to vegetation, though he never heard it suggested, that they are in any degree connected with the succeeding mildew. That crops on fallows and those on layers have shared an equal fate. 8. Nor has there been any difference in consequence of different kinds of manure. 9. That the barberry tree is of such rare

growth in this parish, that if it had any effect upon wheat, it could not but have been ascertained long since, beyond controversy; but, when once an idea has gone abroad, every instance in favour is deemed a proof, while the many in contradiction are never advanced. He hesitates not to pronounce, that it has *no effect* on wheat. Mr. Barker of Congreve had last year, within 50 yards of his barberry tree, one of the best crops of wheat in this neighbourhood; while Mr. Keeling, his next neighbour, at 200 yards distance from the same tree, and near no other, had a crop as bad as Mr. Barker's was the contrary. He knows not of five barberry trees in this parish, but there were more than 50 times as many bad crops; which proportion he dare venture to say, will be found to bear throughout England. How then can it be concluded, that the tree is so peculiarly pernicious in this instance? Since writing the above, he has received an account of Mr. Makerell, who lives in the parish of Brewood, having had a fine piece of wheat, not in the least affected by the mildew, though immediately in the vicinity of a hedge almost entirely composed of barberry bushes. 10. He has never either seen or heard of any exception in favour of wheat of the bearded kind, nor indeed of any other; nor yet that any one sort suffered particularly. 11. That as the mildew totally prevents those ears, which it affects, from coming to any perfection, it does not strike him, that the period of its being reaped can be of any consequence, and if not it must be best to let it stand till the straw has received its full benefit."

And the statements of Mr. Lumbert on this subject are, "1. That no soil is peculiar to the mildew. 2. That late sown crops have generally suffered most; but there have been instances of the reverse. 3. That low and sheltered situations have suffered most; but this has been, perhaps, attributable to the wheat growing more luxuriantly, from its situation, than the stamina of the land could support when it was arriving at maturity: to this may be added a want of ventilation. 4. That a huge crop may be considered a cause of mildew; for an unkind season, or want of stamina in the land, may check the vegetable mucilage before the corn is completely filled, and thereby produce a predisposition to mildew. 5. That no difference is observed in new and old seed, where the situations have been similar. 6. That the first cause of mildew is a predisposition in the wheat. This predisposition is created by a decrease of mucilage in the straw, which allows the watery particles to insinuate themselves, and still further check the circulation of the juices in the stem that are necessary to the perfection of the grain, and had before become languid from the unkindness of the season, or the feebleness of the soil. When the watery particles have insinuated themselves, the straw becomes discoloured, and he has no doubt but a complete putrefaction would immediately succeed it, if it were not prevented by a circulation of air. At all times during its growth, barley and oat straw appears to have sufficient mucilage in itself to resist the effects of the watery particles; but when it is cut it becomes like the stubble in the fields, and cannot much longer resist it. 7. That fallows and layers have been equally liable. 8. He has observed, that an over luxuriant growth in the spring is favourable to the mildew, and has noticed that that luxuriance may be produced by particular manure, such as green vetches ploughed in, &c. which seem to cause a considerable fermentation in the soil, and produce a rapid vegetation for a short time. 9. That early cutting and laying down is most clearly beneficial; and if the wheat is severely affected, it is almost impossible to cut it too soon."

And farther, the facts collected by professor Balsamo in

MILDEW.

Sicily, and detailed in the same work, lead to the same conclusions. For he states it as "evident that the mildew was common to the grain of all Sicily, without exception of kind, of soil, exposition, or other circumstances. It attacked, in different degrees, the barley, oats, and the plants of meadows; almost all plants, whether spontaneous or cultivated: and this consideration proves to him that the opinion which attributes the distemper to fogs and dews, is erroneous; nor is it at all probable, that any meteor should, at one time, be the cause, in places which, from the vicinity of mountains, rivers, and a multitude of other circumstances, had a very different climate from each other; and from the observations registered at the Royal Observatory, it appears, that, as every one knows, the fogs were rather heavier and more frequent in April and May 1803, when no mildew ensued, than in the same months in 1804, when the great mischief followed. And many cases have occurred to him of spots peculiarly given to fogs, and from which the countrymen argued a ruinous mildew, yet bright and clear crops were produced, while spots more free from fogs have been attacked." The same reasoning may "be applied to dews; these are more frequent and copious in the vicinity of rivers and stagnant waters, than in other places; and it is true, that in many of these last, and in more than one of the first, the grain better resisted the mildew. Brucato is a humid district, washed by rivers, and chequered by marshes, which render the air insalubrious; yet it produced this year of mildew a reasonable crop of grain. And he observed at Margana, that the wheat upon a farm situated on the banks of a river, and very humid, with a bad air, was generally better than in the neighbouring country of Vicari, notably more dry from its situation. Grain that is thin upon the ground, is more subject to mildew than that which from thickness retains much more of the dew." It is stated that the "Abbé Rozier, in his voluminous Dictionary, says, that the mildew is caused by the drops of water formed by fogs and dews when dissipated by a hot sun; but in Sicily, the sun in April, and much more in May and June, is always active; and our fogs in May are proverbial." And "in travelling in the beginning of summer, through the country, it is visible, that the mildew, in its various degrees, is connected with the soil, and the divers methods of cultivation; but the variety of effects is mysterious and inexplicable, on the supposition that the cause is external to the plant."

After some remarks on the nature of the disease, Mr. Marshall says, that a certain prevention of it would be a discovery worth millions to the country. "Until this be made, let the grower of wheat, not only endeavour to sow early; but let him look narrowly to his crop, during the critical time of the filling of the grain; and whenever he may perceive it to be smitten with the disease, let him lose no time in cutting it: suffering it to lie on the stubble, until the straw be firm and crisp enough to be set in sheaves, without adhering in the binding places: allowing it to remain in the field, until the grain shall have received the nutriment which the straw may be able to impart. Where wheat has been grown on 'lammas land,' and the ground obliged to be cleared by the first of August, crops have been known to be cut, 'as green as grass,' and to be carried off and spread upon grass land to dry. Yet the grain has been found to mature; and always to afford a fine skinned beautiful sample. Rye-grass that is cut, even while in blossom, is well known to mature its seeds, with the sap that is lodged in the stems. Hence there is nothing to fear, from cutting wheat or corn, before the straw be ripe." The opinion of Mr. Young is likewise the same; he therefore

advises the farmer to be very attentive to his wheat crops in July, as "they are every where liable to this fatal distemper, which admits but of one cure or check, and that is, reaping it as soon as it is struck. The capital managers in Suffolk, know well, that every hour the wheat stands after the mildew appears, is mischievous to the crop. It should be cut, though quite green, as it is found that the grain fills after it is cut, and ripens in a manner that those would not conceive who had not tried the experiment, which he has done many times; reaping so early, that the labourers pronounced he should have nothing but hens'-meat. They were always mistaken, for the sample proved good, while others, who left it longer, suffered severely. The fact is now pretty generally admitted."

It is further stated by the first of these writers, "that the operation of this disease is carried on by the fungus tribe, evidently appears, from the ingenious and persevering labours of botanists," as lately shewn by sir Joseph Banks. (See BLIGHT.) "But fungi, it is equally evident, are an effect, not the cause of the disease. They are the vermin of the more perfect vegetables; and fallen on them, whether in a dead, or in a diseased state; but seldom while they are in full health and vigour. Their minute and volatile seeds may be said to be every where present, ready to produce their kind wherever they may find a genial matrix. Such, at least, appears to be the nature of the fungus, or fungi, of wheat; for it may be liable to the attack of more than one species. In a dry warm summer, which is well known to be favourable to the health, vigour, and productiveness of the wheat crop, the seeds of fungi are harmless, so long as the fine weather continues. On the contrary, in a cold wet season, which gives languor and weakness to the wheat plants, few crops escape, entirely, their destructive effects. A standing crop not unfrequently escapes, while plots that are lodged in the same field, especially in pits and hollow places, become liable to their attack. And, by the facts above stated, we plainly see, that even strong healthy crops may, in a few days, or perhaps in a few hours, be rendered liable to be assailed; not progressively, as by an infectious disease; but at once, as by a *blast* or *blight*. In the state of the atmosphere we are to look for the cause of the disease, in a *standing crop*: and nothing is so likely to bring on the fatal predisposition of the plants as a succession of cold rains, while the grain is forming. The coolness necessarily gives a check to the rich saccharine juices which are then rising towards the ear; and the moisture may, at the same time, assist the seeds of the fungi to germinate and take root. Thus reason and facts concur, in pointing out the cause, and the operation of the disease. There appear to be two reasons why corn which happens to be struck with this disease, in a dry warm summer, is exposed to excessive injury; as facts pretty evidently shew that it is. The habits of the plants render them more susceptible of injury, their rich juices more liable to be checked; and the seeds of fungi, it is probable, are more widely, if not more plentifully, distributed, by such a state of the air; than they are by a cool moist atmosphere. The natural event is too well known: and it is the business of art to endeavour to prevent it."

Consequently "if by cutting down the crop, as soon as it is found to be diseased, the operation can be stopped, as experience, in different instances, has shewn it may, the remedy is easy. It may be asked, in what manner the remedy is thus effected. But to the practical farmer, the fact is all that is required. To him, it is equally indifferent, to know the operation of the remedy, as the operation of the disease. Those who have profited by the remedy here

recom-

recommended, believe, that it 'kills the mildew.' And if it shall appear that the fungus of wheat requires a free supply of air to keep it alive, or in a state of health and vigour, the effect of cutting down the crop will be explained. It will perhaps be found, by experience, that the closer it is allowed to lie upon the ground, and the longer it is bound up in sheaves (provided the natural ascent of the sap to the ear be not interrupted), the more effectual and complete will be the remedy. Further, on the evidence of attentive observation, if wheat, which has been attacked by this disease, be suffered to remain in the field, with the ears exposed, until it may have received the ameliorating influence of dews, or moderate rain (to soften, relax, and assuage the natural rise of the sap), the more productive it will probably become. And it may be still further added, that grain which is cut while under-ripe, is less liable to be injured in the field by moist weather, than that which has stood until it be fully or over-ripe." And a "probable mean of prevention is that of inducing early ripeness (for reasons above offered): either by sowing early; or by forcing manures; or by selecting and establishing early varieties, of wheat most especially; as early varieties of pease, and other esculent plants, are raised by gardeners: a work which only requires ordinary attention; and which, it is hoped, will, without delay, be set about and encouraged by every attentive grower of wheat, and every promoter of rural improvements, in the united kingdom." The method of raising and improving varieties of which will be afterwards noticed. See WHEAT.

MILDEW, in *Gardening* is a vegetable disease, very hurtful to different kinds of trees and plants. It is supposed to proceed from different causes: some consider it as a kind of thick clammy moisture, which falls on, or rather transpires from, the leaves and blossoms of plants, which, by stopping up the pores, prevents perspiration, and hinders their growth. But the author of "The Philosophy of Gardening" suspects it to be a plant of the fungus kind, which grows without light or change of air, and with its roots penetrates the vessels of the vegetables to which it adheres, which are probably previously diseased, and thus deprives them of their due nourishment. But what is commonly denominated mildew, is an insect which is frequently found in vast numbers feeding upon the effused moisture. In a treatise upon this disease by M. Segar, it is conceived to be of a very sharp corrosive nature, and by its acrimony to hinder the circulation of the nutritious sap, in consequence of which the leaves begin to fade, and the blossoms and fruit to be greatly injured.

It is conceived by the first mentioned author, that the best method of removing it is by admitting more light and air, by proper thinning or pruning, so as to restore the natural vigour of the plants.

It is noticed by Mr. Forsyth, that, "contrary to the common opinion, trees are more liable to mildew on south and west walls, than on an east wall;" and that he has frequently removed such trees from a south or west wall, to a north or east wall, where they have frequently recovered.

It is advised, that "whenever danger is apprehended, to wash or sprinkle the trees well with urine and lime-water mixed; and when the young and tender shoots are much infected, to wash them well with a woollen cloth dipped in the following mixture, so as to clear them of all the glutinous matter, that their respiration and perspiration may not be obstructed.

"Take of tobacco one pound, sulphur two pounds, unslaked lime one peck, and about a pound of elder-buds; pour on them ten gallons of boiling water; cover it close,

and let it stand till cold; then add as much cold water as will fill a hogthead. It should stand two or three days to settle, when the scum may be taken off, and it is fit for use.

And "there is a sweet saccharine substance found on the leaves of certain trees, which is generally but erroneously supposed to fall from heaven like dew. It is known by the title of *honey dew*. There are supposed to be two kinds of it, one of which," Mr. Forsyth thinks, "transpires from the leaves of the trees where it is found; and the other is the excrement of a small insect called a vine-freeter, a species of the aphid. Bees and ants are very fond of both these kinds of honey-dew." As this exudation, "by its viscous quality, closes up the pores, and stops the perspiration of trees, it must of course be very hurtful to them."

This is a vegetable disease, which should, in his opinion, be treated in the same manner as the mildew, by washing at the same times.

The nature of mildew is more fully explained in speaking of it as relating to agriculture. See the preceding article.

MILDMAY, Sir WALTER, in *Biography*, the founder of Emanuel college, Cambridge, was surveyor of the court of augmentations in the reign of Henry VII., and privy counsellor, chancellor, and under treasurer of the exchequer in that of Elizabeth. He is celebrated for his uncommon merits in his private and public character. Sir Walter died in 1589.

MILDORFF, in *Geography*, a town of Austria; ten miles W. of Crems.

MILE, FRANCESCO, in *Biography*, born at Antwerp in 1644, was a very ingenious landscape painter, who made the heroic style of Nicolo Poussin his model, and succeeded to a very considerable degree in competition with him. In tones of colour he frequently surpasses him, and more nearly approaches Titian. He fails in the conception of scenery, and the composition of his forms.

He was poisoned, by some envious person, at the early age of 36. Had he been spared for a longer period, we may reasonably expect he would have completely rivalled his great predecessor.

MILE, in *Geography*, a long measure, whereby the English, Italians, and some other nations, use to express the distance between places. See MEASURE.

In which sense mile is used to the same purpose with league, used by the French and other nations.

The mile is of different extent in different countries. The geographical or Italian mile contains a thousand geometrical paces, mille passus, whence the term mile is derived.

The English mile consists of eight furlongs, each furlong of forty poles, and each pole of sixteen feet and a half; so that it is equal to one thousand seven hundred and sixty yards, or five thousand two hundred and eighty feet.

The mile employed by the Romans in Great Britain, and restored by Henry VII., was our present English mile. A degree of the meridian in England, N. lat. 52, according to the late measurement of colonel Mudge, is 121,640 yards, or 69,114 miles. A geographical or sea-mile is the 60th part of such a degree, i. e. 2027 $\frac{1}{2}$ yards; and three sea-miles make a league. A degree of the meridian in N. lat. 45, as measured in France in 1796, is 57008 toises = 121512 yards = 69.092 English miles.

Casimir has made a curious reduction of the miles, or leagues, of the several countries in Europe into Roman feet, which are equal to the Rhinland feet generally used throughout the north.

The

	Fect.		Fect.
The mile of Italy	50,000	The mile of Germany, the largest	25,000
of England	5,454	of France	15,750
of Scotland	6,000	of Spain	21,270
of Sweden	30,000	of Burgundy	18,000
of Muscovy	3,750	of Flanders	20,000
of Lithuania	18,500	of Holland	24,000
of Poland	19,850	of Perfia, called also parafanga	18,750
of Germany, the small	20,000	of Egypt	25,000
the middle	22,500		

The following TABLE shews the Length of Miles, Leagues, &c. Ancient and Modern, in English Yards.

Ancient Roman mile	1610.348
Olympic stadium = $\frac{1}{8}$ th of an ancient Roman mile	201.2935
Stadium = $\frac{1}{10}$ th of an ancient Roman mile	161.0348
Stadium = 1100th part of a degree	111.2
Jewish risin, of which $7\frac{1}{2}$ = an ancient Roman mile	214.713
Gallic leuca = $1\frac{1}{2}$ ancient Roman mile	2415.522
German raft, or common league in France = 2 Gallic leuca	4831.044
Perfian parafang = 2 Gallic leagues	4831.044
Egyptian schœnc = 4 ancient Roman miles	6441.392
German league, or that of Scandinavia = 2 rafts	9662.088
The mile or league of Germany = 200 Rhenish yards	8239.846
Great Arabian mile, used in Palestine in the time of the crusades, rated at $1\frac{1}{2}$ ancient Roman mile	2415.713
Modern Roman mile	1628.466
Modern Greek mile of 7 Olympic stadia	1409.0545
Modern French league = 2500 toises	5328.75
Mile of Turkey, and the common werst of Russia, supposing it seven Olympic stadia	1409.0545
League of Spain = 4 ancient Roman miles	6441.392
Large league of Spain = 5 ditto	8051.74

For other measures of a mile, see Tables under MEASURE.

MILE-stone. This article is introduced solely for the purpose of suggesting an improvement under the title of *Mile-hut*. The comfort and convenience which travellers derive from mile-stones is well known, and the dilapidations which they are subject to, are very generally felt as a grievance. Instead, however, of pointing out remedies for the evil (which might easily be done), we wish to see them entirely superseded by substituting mile-huts in the place of them. In every new act of parliament for a turnpike-road, or in any amended act, let it be a standing order that a clause shall be introduced, obliging the trustees to erect mile-huts on the whole line of road.

They should be uniform and cheap; the whole cost not to exilt forty pounds; they should be lime-whitened in the manner of the buildings in South Wales. The door to be the place of measurement, over which a painted board, with letters and figures very legible, denoting the place, thus, { London 5 } and underneath the name of the cottager, "Jones," in a different character. Each hut should be furnished with hammers, a saw, a screw-wrench, nails, cords, twine, and sundry parts of harness to be paid for at low fixed rates by those requiring them, and the keepers to be under similar regulations for good behaviour as toll collectors. In winter each hut to have a lamp burning all night.

The advantages attending such a plan are more than can readily be conceived. It would insure a large supply of cheap cottages all over the kingdom, and would be particu-

larly convenient for the labourers who repair the roads, who would never be more than half a mile, when at work, from their home. The trustees would be sufficiently remunerated by an abatement in the wages, or an easy rent to the occupier. Coaches, horses, and every sort of travellers meeting with accidents, or needing assistance, would always be within half a mile of help, and a certain knowledge of where it was to be had. But it is needless to enlarge, and all we wish is, that some member of parliament would endeavour to get the experiment tried upon some one stage, and we have no doubt it would soon come into general use.

MILECZA, in *Geography*, a town of Lithuania, in the palatinate of Wilna; 76 miles E. of Wilna.

MI-LEI, a town of China, of the second rank, in the province of Yun-nan. N. lat. $24^{\circ} 34'$. E. long. $103^{\circ} 14'$.

MILENT, a town of Prussia, in the province of Pomerelia; 5 miles S.W. of Marienburg.

MILES, a Latin term, which, in its general import, signifies *foldier*.

In our English laws and customs, miles is peculiarly appropriated to a knight, called also *eques*.

MILESARA, in *Geography*, a town of Asiatic Turkey, in the province of Diarbekir; 24 miles W. of Ourfa.

MILESBURY, a post-town of America, in Mifflin county, Pennsylvania; 262 miles from Washington.

MILEŞIMO, a town of France, in the department of the Stura; 10 miles N.E. of Ceva.

MILETIN, a town of Bohemia, in the circle of Koniggratz; 12 miles N.N.W. of Koniggratz.

MILETO, a town of Naples, in Calabria Ultra, the see of a bishop; said to have been built by the Milesians, after Darius

rians had destroyed their city. It was demolished by an earthquake in the year 1783; 22 miles S.S.W. of Squillace N. lat. 38° 25'. E. long. 16° 25'.

MILETS, anciently *Miletus*, a town of Asiatic Turkey, on the W. coast of Naxos, once a celebrated city of Asia Minor, in Ionia. It was situated on the southern bank of the gulf into which the Meander discharged itself; but this river gradually accumulated its deposit in this gulf, that the town of Miletus was removed, in process of time, more than a league within the land. The town of Miletus was N. of the Posidean promontory, S.E. of the promontory Trogium, and W.S.W. of the town of Myus. This town was one of those which the Greeks conquered on their arrival in Asia. The mouth of the Meander, which was very distant from this town, was in the time of Pausanias under the walls of Miletus. This capital of Ionia was adorned with superb edifices, and was celebrated for its commerce, sciences, and arts. It had a grand temple of Ceres. The tomb of Nellesus, the son of Codrus, king of Athens, by whom the town was founded, might be seen near the walls, upon the way that led to the temple of Apollo Didymæus. This temple was burnt by Xerxes, but rebuilt by the Milesians on so large a scale, that, as Strabo reports, it was equal to a village in extent, whence it remained uncovered, but was surrounded by a thick grove, which was inhabited by the priests who served the temple. The citadel constructed by Tissaphernes, was situated on the isthmus which separated the ancient town from the new. The theatre, though built of stones, was cased with marble, and enriched with sculptures. Of all these superb edifices, there now remain merely mutilated marbles, half buried in the ground. Miletus was the native place of Thales, one of the seven wise men of Greece, and of Aspasia, the wife of Pericles. Venus had a temple at Miletus, and another in its vicinity. This city was anciently called *Lelegeis*, from the *Leleges* who inhabited it; afterwards *Pitynda*, from the quantity of pines which its territory produced; at a later period *Anactoria*; and last of all, *Milefos*, and in Latin *Miletus*. This town became illustrious by the number of colonies which proceeded from it. The Milesians, when free from a foreign yoke, were often reduced to a state of miserable vassalage by domestic tyrants. In the time of Antiochus II., king of Syria, we find that a person named Timarchus reigned in Miletus, and exercised great cruelties on the citizens, till he was driven thence by that prince, who, on that account, was honoured by the Milesians with the surname of *Θεός*, or God. This town lies at the distance of 64 miles S. of Smyrna. N. lat. 37° 22'. E. long. 27° 13'.

MILFOIL, in *Botany*, and the *Materia Medica*. See *ACHILLEA*.

MILFORD, or *MILFORD Haven*, in *Geography*, a sea-port town situated in the parish of Stanton, hundred of Rhôs, and county of Pembroke, South Wales, is of very modern origin, having been founded since the year 1790, and raised to its present importance by the patriotic exertions of the honourable Mr. Greville, nephew to the late sir William Hamilton, on whose property it stands. Happening to be here with his uncle in 1784, the penetrating and scientific eye of Mr. Greville quickly perceived the many natural advantages which this situation offered for a naval and commercial establishment. He accordingly prevailed upon sir William to apply to parliament for an act to enable him to set out legal quays, establish markets, construct docks, and in general to do every thing necessary for insuring the prosperity of the intended town. This object being effected, the conduct of the undertaking was entirely committed to Mr. Greville, who immediately laid out the ground in allot-

ments, according to a regular plan, and began his labours by the erection of a large inn or hotel. Numerous purchasers quickly appeared, so that in less than ten years the town had made considerable progress, and began to assume an air of neatness and consequence. Since that period Milford has continued gradually increasing in extent and importance. Many improvements have been made in the haven for the greater safety and accommodation of the shipping; and a dock-yard has been formed at the suggestion of lord Spencer, where several large vessels of war have been built and others repaired.

The situation of this town is most singularly beautiful, being seated on a small promontory, the sides of which descend gently to the water. The principal haven stretches itself to the south, and presents the appearance of a spacious lake. This harbour is one of the safest and most commodious in the world, and contains sixteen creeks, five bays, and thirteen roads, where upwards of a thousand sail may ride in perfect security. The town at present consists chiefly of three streets, with crossings, running in a direction from east to west, and parallel with the shore of the haven. At the extremity of the lower row of houses stands the church, an handsome edifice, consisting of a nave, chancel, and two side aisles. Several of the windows in this church exhibit escutcheons of painted glass, displaying the arms of Barlow, Hamilton, and Greville. In the chancel stands an ancient vase of red porphyry, brought from Egypt by the learned Dr. Pococke, and intended for the baptismal font, but that idea not coinciding with the religious feelings of a considerable part of the congregation, another of Derbyshire marble was fixed opposite to it for that purpose. Near the vase is placed a trunk of the mainmast of the *L'Orient*, the French admiral's flag ship, which was blown up at the battle of the Nile. At a short distance eastward from the church stands the old chapel of St. Catharine, formerly dependent upon Stanton, the mother church. It is a very ancient building, having the nave vaulted into a pointed roof; and since the erection of the new chapel has been converted into a powder magazine. The market-house is a very neat structure, as is likewise the custom-house; the collection for which takes in both sides of the haven from Milford town to the harbour's mouth, and round the coast of Bride's bay to St. David's. Two batteries for the defence of the town and haven have been lately erected, each of them mounting seven guns.

Milford is now the regular port for the mails from England to Waterford, for the conveyance of which five packets are stationed here, so that a daily communication is thereby kept up with Ireland. The chief trade of the town is its South sea whale fishery, which is carried on with great success by a colony of Quakers from the island of Nantucket, who were invited to settle here by Mr. Greville. They are, like most of their brethren, an industrious and well-disposed people, and have greatly contributed by their exertions to the progress of the new establishment. There is, likewise, some trade in wood and other stores requisite for the equipment or supply of his majesty's ships, or other vessels which may find it necessary to put in here for repair or safety. There are two quays for the landing of goods, and extensive store-houses for their reception, under the management of established officers. Two markets are held in this town during the week, on Tuesday and Saturday, but there are no fairs. The family of Philips derive from hence the title of baron. For the encouragement of the science of ship-building a boat-race was some years ago established here under the auspices of lord Cawdor and Mr. Greville. The prize for the winning boat of the first class of twenty feet keel, is a cup

cup given by his lordship of the value of twenty-five or thirty pounds; and there is besides an inferior prize for boats of a second class from sixteen to eighteen feet keel.

The neighbourhood of Milford exhibits a well inclosed and highly cultivated country. Several elegant villas belonging to the merchants of Milford contribute much to its beauty. The old town of Haking stands on the W. side of the influx, call Priory Pill. Near it is an elegant observatory built by Mr. Greville, and, with the mathematical school contiguous to it, were placed under the direction of Mr. Firminger, who was for eight years sole assistant to Dr. Maskelyne. Here are likewise the ruins of the priory from whence the inlet derives its name. This religious establishment owed its foundation to Adam de Rupe, or de la Roche, who appears to have been a man of power and consequence in this district. It was dedicated to St. Mary and St. Buddoch for monks of the order of Tyrone, who in time forsook that strict rule and became Benedictines. A small portion of this edifice only now remains; most of the materials of which it was composed having been carried off within the memory of man, to assist in the erection of other buildings in the neighbourhood. The earl of Richmond, afterwards Henry VII., is said to have landed at this place, in his enterprise against Richard III., on the seventh of August, 1485. On the eastern side of the Pill, or influx, stands Castle Pill, which was formerly a fortification for its protection. In the reign of queen Elizabeth it was reckoned among the castles in Pembrokehire; and is mentioned, in 1644, as one of the strongest posts which the royalists maintained in this part of the country. From the misconduct of the garrison, however, it was subsequently taken, after a short resistance, by a force apparently inadequate to the undertaking. The village of Stanton, which gives name to the parish in which Milford is situated, lies on the road between that town and Haverford-west. The church here was garrisoned during the civil wars by the troops of the parliament, with the view of interrupting the communication between Haverford-west and the fort already mentioned. According to the parliamentary returns of 1801, the whole population of this parish amounted to 1291 persons, a great proportion of whom resided in Milford. Fenton's Historical Tour through Pembrokehire, 1 vol. 4to. Carlisle's Topographical Dictionary of Wales, 1 vol. 4^o.

MILFORD, a township of America, in Milflin county, Pennsylvania.—Also, a small town in Worcester county, Massachusetts, 18 miles from Worcester, containing 907 inhabitants.—Also, a post-town of the state of Delaware, pleasantly situated on the N. side of Maspilon creek, about 12 miles W. of its mouth in Delaware bay; containing more than 100 houses, inhabited by Episcopalians, Quakers, and Methodists.—Also, a town of Northampton county, Pennsylvania, laid out on the N.W. side of the Delaware, in an elevated situation, at Well's Ferry, 120 miles above Philadelphia. A paper-mill has been erected here by a Mr. Biddis, who has discovered the method of making paper and pasteboard by substituting a large proportion of saw-dust in the composition.—Also, a post-town of Connecticut, in Long-Island sound, and in New Haven county, 13 miles S.W. of New Haven. The Indians call this town "Æopowage;" and it was settled in 1638. It contains an episcopal church, and two congregational churches.

MILFORD Haven, a deep bay on the coast of Nova Scotia, to the S.W., round the point of the strait of Canso.—Also, a bay on the N. coast of Virginia. N. lat. 37° 26'. W. long. 76° 20'.

MILHAU, a town of France, and principal place of a district, in the department of Aveyron, seated on the Tarn.

In 1371, this town was taken by Edward III., king of England; 27 miles S.E. of Rodés. The place contains 6077, and the canton 10,443 inhabitants, on a territory of 297½ kilometres, in nine communes. N. lat. 44° 6'. E. long. 3° 10'.

MILHAUSEN, a town of the duchy of Stiria; 10 miles E. of Gratz.

MILI, a river of Sicily, which runs into the sea, seven miles S. of Messina.—Also, a town of Thibet; 45 miles N.E. of Tchiatam.

MILIANI, a town of Africa, in the kingdom of Algiers; 22 miles S.E. Shershell.—Also, a river of Africa, in the kingdom of Tunis, which runs into the Mediterranean, about 10 miles S.E. of Tunis.

MILIARENSIS, in *Antiquity*, a silver coin of the empire, substituted by Constantine in the room of the denarius; and so called because he fixed the price of the pound of gold at 1000 pieces of this new silver. But as he divided the pound of gold also into 72 solidi, each solidus really contained 13² miliarenfes, though it passed for 14; which difference between the real and current value of the solidus, in relation to the miliarenfes, must have occasioned disputes in the payment of small sums. To remedy this inconvenience, it was thought proper to alter the weight of the silver money, and having fixed the price of the pound of silver at five solidi, to coin sixty pieces out of it, which retained the name miliarenfes, though the pound of gold was worth but 864. It does not appear how many miliarenfes Constantine coined out of the pound of silver: but if the piece of gold was nearly the same in his reign, as when five solidi were worth a pound of silver, the pound must have been worth 14² pounds of silver; and 1000 divided by 14² gives 69⁺ for the number of miliarenfes coined out of the pound. Therefore it is probable, that Constantine's number was either 69 or 70. If the former, each piece should weigh 73⁸/₂₇ troy grains; if the latter, 72³/₁₈. According to the former estimate, the proportion of gold to silver was always 14¹/₂ to 1; according to the latter, 14²/₇ to 1. Phil. Trans. vol. lxi. part ii. p. 513. See **FOLLIS**.

MILIARES GLANDULÆ, in *Anatomy*, glandular bodies distinguished by their small size; such as the supposed glands of the skin, &c.

MILIARIUM, the name of a tall and narrow vessel, used in the bathing of the ancients, for heating water to any degree, to give warmth to the rest. See Mem. Acad. Inscrip. vol. i p. 127.

MILIARY ERUPTION, in *Medicine*, an eruption of minute vesicles, appearing in persons confined to bed, in hot and close apartments, especially after profuse sweating. The term has been adopted from ancient times, from the resemblance of the vesicles in size and appearance to *millet* seeds.

MILIARY Fever, a denomination given to fevers of every description, when accompanied by an eruption of miliary vesicles.

This is the light in which the more correct observation of our times has taught us to consider the *miliary fever*. The physicians of the seventeenth and the greater part of the eighteenth century describe the miliary fever, as a distinct eruptive fever, arising, like the small-pox, measles, &c., from a peculiar poison or acrimony, of the proper concoction and expulsion of which from the system the eruption was deemed evidence, according to the doctrines of the humoral pathology. Under this notion, the disease was described, by different observers, with a variety of titles, and no small degree of confusion arose from the misapplication of these titles to other diseases, which bore some resemblance to it.

Thus,

MILIARY FEVER.

Thus, it was called, the military disease (*Morbus miliaris*), the military fever, the vesicular fever, or simply *miliaria*, and *miliaris*, and others, confounding the vesicular appearances with the purple spots, or petechiæ of malignant fevers, or supposing them to be of a similar nature, applied the term *Purpura* to it; calling it *Purpura alba*, *Purpura miliaris*, *Febris purpurata*, &c. Again, another mistake, equally gross, was committed in places where the scarlet-fever was epidemic, in confounding the rash of this disease with the vesicular eruption of *miliaria*. This occurred particularly at Leipzig, where *scarlatina* was extremely prevalent and fatal, in the year 1672, and a history of which was published by Cbrill. Joan. Langius. (See his *Prax. Med.* part ii. cap. xiv. § 9.) This fever was extremely contagious, and spread over the greater part of the continent, and was called a military fever; it has been even considered by many writers as the prototype of all military fevers, and the first example of its appearance in Europe. See Macbride, *Method. Introductio. to the Theory and Pract. of Physic*, part ii. chap. xvii. Hamilton de *Febri Miliari*. Allioni *Tract. de Miliarium Orig. Progress. &c.* J Fordyce *Hist. Febris Miliaris*, &c.

These errors were corrected by De Haen (*De Divis. Februm*, § 4.); and the true nature of the military eruption, as always secondary or symptomatic, and as the result of perspiration and of a continued heating regimen, in various febrile diseases (of which, indeed, Sydenham had long before expressed his belief), was satisfactorily shewn by Mr. White (in his *Essay on the Management of Lying-in Women*), and by Dr. Cullen (*Nosol. Method. Gen.* xxxii. *note.*) In truth, the occurrence of this eruption, and of the severe and often fatal symptoms of fever, with which it was accompanied, affords a lamentable proof of the mischief resulting from mistaken hypothesis on medical subjects, when carried to the bedside of the sick. For this *military fever* has been, at different times and places, not only produced, but actually rendered epidemic, by the mal-practice of individuals. Mr. White asserts, that a midwife at Manchester, who had very extensive practice among all ranks of women, and was tolerably successful in other respects, had a remarkable number of her patients seized with the military fever, during their accouchement, which proved fatal to many, particularly to the wives of several of the principal tradesmen. This disease "became so alarming and notorious, both in this neighbourhood and in distant parts of the country, as to acquire the name of the Manchester fever." While at the same time, other practitioners of the place, who pursued a different plan of treatment, met with no such fever. So that the sarcasm of Dr. Shebbeare was but too correct, when he recommended gentle means of supporting the vital heat, "otherwise the military eruption may be rather a symptom of the physician than of the disorder, as it is to be feared that some, through mistaken practice, have discovered a way of making military fevers, and may be called a kind of manufacturers of that disease." (*Practice of Physic.*) "Quid verò demum generi humano calamitosius," says De Haen, "quam quod et plebe et medicis conspirantibus, tot millenni quotannis ægri, ab ipso principio acutorum, in sudores symptomáticos agitentur, ac veluti fundantur, ut coacta omnino crisis, in perisque aut letalis, aut periculosa saltem, producat; interea dum salutaria nature molimina turbantur, confunduntur, ac penitus sufflaminantur. Faxit Deus, ut demum sapiant Phryges!" *Februm Divis.* § 4. p. 84.

Hippocrates and the ancients have said little respecting this military fever, because they followed too steadily the dictates of nature in their practice to produce it. They do,

however, mention a casual appearance of military vesicles, in febrile diseases. (See Hippocrates *Epidem.* lib. i. § 3. *ægror.* 2. lib. ii. § 1. & § 3.) In like manner, those practitioners who have been conversant with the treatment of diseases during the last thirty years, have witnessed but casual and slight occurrences of these eruptions, and are totally unacquainted with the formidable military fever, described by the physicians of Leipzig, and subsequently very well known in this country.

It has been universally observed that women, during their puerperal confinement, although not exclusively, were the most frequently attacked by the military fever. This, no doubt, arose from the peculiar assiduity with which the hot and sweating regimen was enforced with puerperal women, of which Mr. White has given an impressive description. (*Loc. cit.* p. 6. et seq. 3d edit.) Under the suffocating heat and closeness of the room, in which was a large fire and a crowd of people, and every crevice, even the key-hole, closed; under an additional load of bed-clothes, from which the good woman was not allowed to put out her arm, or even her nose; and constantly supplied with heating liquors from the spout of a tea-pot to keep up the sweating; in such a situation, "a few days after delivery the patient is, perhaps, seized with a shivering fit, and the nurse is surprized, as she protests she has not had the least waft of cold; more clothes are heaped upon her; spirituous liquors and hot spices are given her, to throw off the cold fit, which most certainly increase the succeeding hot one. A warm room, plenty of clothes, and warm drinks are continued, to throw her into a sweat, but have frequently a contrary effect, by increasing and prolonging the burning fit; which at last terminates in a most profuse sweat, continuing many nights and days without giving relief." (*Ibid.* p. 13.) The tongue becomes dry and warm; the pulse quick, small, and creeping; and the patient complains of great anxiety and oppression about the præcordia, attended with sighings, lowness of spirits, lassitude, and extreme languor and debility. "If the hot regimen be continued," Mr. White proceeds to state, "with vinous spicy caudles, hot alexipharmic medicines, volatile alcalious salts and spirits, opiates, and a close room, so as to keep the patient in a perpetual sweat, vibices or petechiæ appear, or (military) eruptions, either of the white or red kind, or both, first upon the neck and breasts, afterwards extending themselves all over the body, one crop succeeding another till the patient is worn out; but they give no relief, are not in any way critical, nor is there indeed any crisis in this disorder, except the looseness." (P. 16.) In the military fever, which was epidemic among puerperal women at Leipzig, about the year 1650, many of the most violent symptoms, connected with malignant fever, concurred; such as extreme prostration of strength, restlessness, and delirium, tremors and convulsive motions of the limbs, dimness of sight, hæmorrhagies, &c. (See Gotofr. Welfsch, *Hist. Med. Nov. Morb. Puerp. qui der Friesel dicitur*:—in Haller, *Disput. Med.* tom. v. § clxxiv.) The disease is said to have been called *der Friesel*, from the resemblance of the rough state of the skin, to a sort of cloth called *friesel*.

The utmost irregularity seems to have prevailed, in respect to the period at which the military vesicles made their appearance. According to Welfsch, it appeared as early as the second day after parturition, or within the first week; but other writers have not seen it before the fifth day, and others again on the seventh, eighth, tenth, or eleventh, on the fourteenth, sixteenth, and even twenty-eighth day. This difference would, of course, be expected to happen, in consequence of the different degrees of the hot regimen adopted

in different instances, and of the variety of season and of individual constitution. It seems to be agreed, however, notwithstanding the hypothetical notions of the salubrity of such expulsions of supposed morbid matter from the body, that a favourable termination of the disease is not more certain from a copious eruption, or from its early appearance; but that, on the contrary, the fuller and earlier the eruption is, the greater is the danger.

The distinction that has been made by writers in general, respecting the two kinds of miliary vesicles, the *red* and the *white*, is futile; as these differences of colour are by no means specific, but depend entirely upon the size of the vesicles, their transparency, and the degree of inflammation accompanying them: inasmuch that the eruption which is *red* in the beginning, when the vesicles are perfectly diaphanous, becomes *white* in a day or two, when the inflammation of the surface is less, and the lymph contained in the vesicles becomes of a milky opacity.

Mr. White observes, that "the diseases, or rather the symptoms, which are said to succeed the miliary fever, are hectic heats, loss of appetite and of spirits, and swellings of the legs, feet, and thighs; but these are nothing more than what follow other putrid fevers. Those who have had this fever are particularly liable to returns of it during their whole lives; owing most probably to the skin being over relaxed, and its tone destroyed, by a too hot and forcing treatment."

Miliary eruptions have been produced in consequence of feverish complaints, which confined patients to bed, and occasioned a sweating condition of the skin, as well as in the puerperal state. Thus it has sometimes occurred in persons who became feverish after some important surgical operation, or remained in bed in consequence of some accident; it has occurred also in catarrhal and rheumatic fevers, where the natural tendency to sweating is considerable, and in various other febrile complaints. Hence we may explain the observations of some writers on the subject, who speak of the miliary fever as imitating or being disguised under the character of other febrile diseases; when, in fact, the eruption was secondary, and had supervened upon the hot and sweating state of the patient in those other fevers respectively; such as tertians, quartans, remittents, &c. (See *Memoires de la Soc. Royale de Medecine*, par M. Barailon, tom. i. p. 193.) Indeed there is scarcely any acute disease, with which the miliary eruption has not been described as combined, and with which it might be expected to be combined, while the mode of practice, which gave rise to it, continued to be pursued: thus it has been conjoined with typhus, gout, pneumonia, measles, small-pox, scarlet-fever, whooping-cough, the fever of dentition, asthma, &c. See Allionius *Traët. de Miliarium Orig. Progress. Nat. et Curat.* The *Cure of the Miliary Fever*, by a subject to Mithridates.

That excellent writer, Dr. Macbride, was misled, like his less intelligent brethren, by the prevalent hypothesis of the concoction and critical expulsion of morbid acrimony, and considered miliary fever as something specific, like the contagious eruptive fevers. He has accordingly described it, as occurring alone and uncombined, under the term *miliaris simplex*, seu *benigna*. "The febrile symptoms previous to the eruption," he says, "are not very high nor distressing; no great pain, thirst, or sickness; the pulse rather depressed than hard; they increase, however, gradually till the third or fourth day, when the eruption strikes out, chiefly on the neck, back, and breast, being preceded by a profuse sweat, of a sourish smell, and a particular tingling sensation in the skin, especially in the fingers, and an itching in those places where the miliary pustules (vesicles) are most plentiful. In

about thirty hours the eruption is full out, and replete with serum, with a slight inflammation round the basis of the little vesicles, occasioning a fulness and tension of the skin. The febrile symptoms now subside, the patient continues to sweat plentifully, and makes higher-coloured urine, the pulse gradually becomes full, soft, and equable, and by the end of the week the eruption dries up, and the cuticle falls off in scales." (*Methodical Introd. to Theory and Pract. of Physic*, part ii. chap. 17.) Sir Richard Blackmore gives a similar account of the progress of the miliary eruptions, the drying of which, "in the more kindly sort, is generally accomplished in seven days." (*Treatise on the Plague*.) But in the worse sorts, he says, the time is much protracted; and he avers, that he has seen the fever continue, and a second, and even a third crop of the eruptions appear, and go through the same course. And Dr. Brocklesby mentions a case, in which the low pulse, great prostration of strength, and other severe symptoms, continued *forty-six days*, in which time *four* successive crops of miliary vesicles occurred. See his *Paper on Seltzer Water*, *Med. Obs. and Inquir.* vol. iv. art. ii. p. 31.

Having stated these facts upon the authority of the best writers on the subject, it is scarcely necessary to enter into any detail of the discussion, relative to the origin of the miliary fever. The sagacity of Sydenham detected their efficient cause in the hot regimen generally practised in his time, and long afterwards. "*Licet sua sponte nonnunquam ingruant, sapius tamen levi calore et cardiacis extorquentur.*" (*Sched. Mon. de Nov. Febris Ingressu*.) And his opinion has been substantiated, and the arguments and hypothesis of those, who denied its truth, practically refuted by the almost total disappearance of the disease, even in puerperal women, since the rational method of ventilation and regimen, now practised, became generally prevalent among medical men.

It is scarcely necessary, therefore, to say any thing respecting the method of treatment. In all circumstances, under which a person is confined to bed, the room in which he lies should be as free from any disagreeable smell or closeness as any other apartment in the house; which can be readily effected by the constant admission of fresh air and by cleanliness: and his bed-clothes, whether he labour under fever or not, should be as light as may be, provided the skin is not cooled below the natural standard of temperature, and the patient experiences no actual sensation of chilliness. These rules should be strictly observed, even under a state of perspiration or profuse sweating; for, so long as no direct current falls upon the patient, coolness of the surrounding air will moderate, without suppressing, the cutaneous discharge. Even when the miliary eruption has appeared, in consequence of previous improper management, coolness of the apartment and bed of the patient, with a free access of fresh air, will be found the most effectual cordial, and will support the strength, and subdue the languor of body and mind more powerfully than "gallons of wine." Consult Mr. White's able treatise above quoted, in which references to all the writers on the subject are given, and from which, as well as the *Essay of De Haen, de Divisione Februm*, the most satisfactory information will be obtained.

MILICIA, in *Geography*, a river of Sicily, which runs into the sea; 10 miles E.S.E. of Palermo.

MILIEU HARMONIQUE, in *French Music*, is the name sometimes given to the 3d of a common chord or triad, as being the mean or middle between the key note or fundamental base and its 5th.

MILILLO, in *Geography*, a town of Sicily, in the valley of Noto; 8 miles S.S.E. of Lentini.

MILIN,

MILIN, a town of Bohemia, in the circle of Beraun; 4 miles from Pezibram.

MILIOIUM, in *Surgery*, a small tumour of the eyelids, so called, from its being of the size of a millet seed.

MILLOQUEAN CREEK, in *Geography*, a river of Upper Canada, which, running northerly, discharges itself into lake Simcoe, now called "Holland's river."

MILIS, a town of Sardinia; 12 miles from Oristagni.

MILITANT, a term used of the body of Christians, while here on earth.

The Romanists divide the church into militant, patient, and triumphant; the militant is on earth; the patient, or passive, they place in purgatory; and the triumphant in heaven.

MILITARE AERARIUM. See **AERARIUM**.

MILITARIS TOGA. See **TOGA**.

MILITARIS Via. See **VIA**.

MILITARY, something belonging to the militia, or soldiery. Thus,

Military Architecture denotes the art of fortification. See **ARCHITECTURE**, and **FORTIFICATION**.

Military Art, is the art or science of making or sustaining war to advantage. See **WAR**.

Military Column. See **COLUMN**.

Military Court. See **COURT of Chivalry**.

Military Discipline. See **DISCIPLINE**.

Military Estate includes the whole of the soldiery; or such persons as are peculiarly appointed among the rest of the people for the safeguard and defence of the realm. Although the laws and constitution of this kingdom know no such state as that of a perpetual standing soldier bred up to no other profession but that of war, it has for many years past been judged necessary by our legislature, for the safety of the kingdom, the defence of the possessions of the crown, and the preservation of the balance of power, to maintain, even in time of peace, a standing body of troops, under the command of the crown, who are however *ipso facto* disbanded at the expiration of every year, unless continued by parliament; and if from experience past we may judge of future events, the army is now lastingly engrafted into the British constitution; with this singularly fortunate circumstance, that any branch of the legislature may annually put an end to its legal existence by refusing to concur in its continuance. (Bl. Com. b. i.) The military force of the kingdom comprehends regulars, including the royal marines, the militia, and volunteers. See **MARINES**, **MILITIA**, **SOLDIER**, and **VOLUNTEERS**.

Military Execution, the delivery of a city or country up to be ravaged and destroyed by the soldiers, upon its refusing to pay the contribution money imposed upon it. It denotes also the punishment inflicted by the sentence of a court martial. See **EXECUTION**.

Military Exercises are the evolutions or various manners of ranging and exercising soldiers. See **BATTALION**, **EVOLUTION**, **EXERCISE**, and **MANUAL Exercise**.

Military Feuds. See **FEE** and **FEUD**.

Military Fever, a kind of malignant fever frequent in armies, by reason of the ill food, &c. of the soldiers. See **FEVER**, and **TYPHUS**.

Military Government, is the supreme command and disposal of all the military power of a nation, by land and sea.

Military Law. See **LAW of Arms**, and **MARTIAL**.

Military Machine. See **MACHINE**.

Military Merit, Order of, in *Heraldry*, was instituted in France, in the year 1759, by Louis XV. in honour of those officers of his army who were Protestants. The

marks of honour are the same as those of the order of St. Louis. The ensign of the order is also of the same form as that of St. Louis, with this difference, that on one side it is a sword in pale; within this motto *PRO VIRTUTE MILITICA*; and on the reverse is a chaplet of laurel; within this inscription, *M. D. XV. INSTITUIT 1759*.

Military Music, before the introduction of fire-arms, served to animate the soldiers in battle and assaults of places, as well as for purposes of signals for the different manoeuvres and duties in camp and garrison; and, therefore there is no reason to doubt its having been used in our ancient armies. The common military instruments of music were the trumpet, drum, fife, and horns of different kinds. See an account of each under its proper title. In modern times, kettle-drums and trumpets have been chiefly appropriated to the horse. The dragoons long had the hautbois and side-drum, but about the year 1759 changed these for the trumpet: the infantry had only the drum, till the introduction of fifes. Since the introduction of light infantry, many of these companies have used the bugle-horn.

Of late years, in addition to the drums and fifes, each regiment of infantry has had its band of music. The instruments are chiefly hautbois, clarinets, French horns, bassoons, trumpets, cymbals, and in some the tabor and pipe. The band is usually composed of men borne upon the establishment of the regiment as privates, and allowed some additional pay from the non-effective fund of the field-officers and captains of companies. These officers also defray the charge for instruments, extra-clothing, music, &c. though in many corps the money paid for discharges has been applied to the support of the regimental band. Grose's Mil. Ant. vol ii.

Military Order. See **ORDER**, and **KNIGHTHOOD**.

Military Pyrotechny. See **PYROTECHNY**.

Military Rewards. See **REWARDS**.

Military Tenures. See **TENURE**.

Military Testament, among the Romans, was what we call a nuncupative will; or a testament made only by word of mouth, in the presence of two witnesses.

This was a privilege peculiar to the soldiery, and to them only when in the field; for at other times they were subject to the common laws in this respect. See **SOLDIER**.

Military Townships, in *Geography*, townships of America, in the state of New York; deriving their appellation from the following circumstance. The legislature of the state granted $1\frac{1}{2}$ million of acres of land as a gratuity to the officers and soldiers of the line of this state. This tract, forming the country of Onondago, is bounded W. by the E. shore of the Seneca lake and the county of Ontario, N. by the part of lake Ontario near Fort Oswego, S. by Tioga county, and E. by Chenango county. This pleasant country is divided into 25 townships of 60,000 acres each, which are again subdivided into 100 convenient farms, of 600 acres, amounting in the whole to 2500 farms, well watered by a multitude of small lakes and rivers.

Military Ways, viz militares, are the large Roman roads, which Agrippa procured to be made through the empire, in the time of Augustus, for the more convenient marching of troops, and conveyance of carriages.

N. Bergier has wrote the history of the origin, progress, and amazing extent, of these military roads; which were paved from the gates of Rome to the extreme parts of the empire. See **WAY**.

MILITELLO, in *Geography*, a town of Sicily, in the valley of Demona, on the N. coast; 16 miles S.W. of Patì.

MILITES CANDIDATI. See CANDIDATI.

MILITIA, a collective term, understood of the body of soldiers, or persons who make profession of arms.

The word comes from the Latin *miles*, a soldier; and *miles* from *mille*, which was anciently wrote *mile*. For in levying soldiers at Rome, as each tribe furnished a thousand, *mille*, or *mile*, *men*; whoever was of that number, was called *miles*.

MILITIA, in its proper and more restrained sense with us, is used to signify the inhabitants, or, as they have been sometimes called, the *trained-bands*, of a town or county; who are armed on a short warning for their own defence. In which sense militia is opposed to regular stated forces. Soon after the restoration of king Charles II., when the feudal tenures were abolished, it was thought proper to ascertain the power of the militia, to recognize the sole right of the crown to govern and command them, and to put the whole into a more regular method of military subordination; and the order in which the militia now stands by law, is principally built upon the statutes which were then enacted, viz. 13 Car. II. cap. 6. 14 Car. II. cap. 3. 15 Car. II. cap. 4.

It is true the two last of them are apparently repealed; but many of their provisions are re-enacted, with the addition of some new regulations, by the present militia laws; the general scheme of which is to discipline a certain number of the inhabitants of every county, chosen by lot, for three years, and officered by the lord-lieutenant, the deputy lieutenants, and other principal land-holders, under a commission from the crown. They are not compellable to march out of their counties, unless in case of invasion or actual rebellion, nor in any case compellable to march out of the kingdom. They are to be exercised at stated times; and their discipline in general is liberal and easy; but when drawn out in actual service, they are subject to the rigour of martial law, as necessary, to keep them in order. This is the constitutional security, which our laws have provided for the public peace, and for protecting the realm against foreign and domestic violence, and which the statutes 2 Geo. III. cap. 20. &c. 9 Geo. III. cap. 42. declare is essentially necessary to the safety and prosperity of the kingdom. Blackst. Com. book i.

By the 2 Geo. III. cap. 20. all former acts relating to the raising of the militia are repealed, except in such cases as are therein specially directed to be subject to the provisions of the former acts, or any of them; particularly with regard to the city of London, the Tower Hamlets, and the Cinque Ports. Several statutes were subsequently enacted, which it is needless to recite; because by the 42 Geo. III. c. 90. the chief former acts relative to the militia are from June 26, 1802, repealed; excepting such as relate to the city of London, Tower Hamlets, the Stannaries, and the Cinque Ports. The militia raised under such acts shall be subject to this act; and all deficiencies under the former militia laws are to be supplied, and the men so raised are to serve according to this act. It is first provided by this act that the king shall appoint lieutenants for the several counties, &c. with full power to call together, arm, array, and cause to be trained and exercised such persons, once in every year; and such lieutenants shall appoint 20 or more persons, duly qualified, to be deputy-lieutenants, and shall also appoint a proper number of colonels, lieutenant-colonels, majors, and other officers, qualified to train, discipline, and command the persons to be armed and arrayed. The names and ranks of all such officers to be certified to his majesty, and subject to his approbation. Every person, appointed to be a deputy-lieutenant, shall be either in law or equity, for his own use and benefit, in possession of a freehold, copyhold, or customary

estate for life, or for the life of his wife, she having a freehold, copyhold, or customary estate for her life, or for some greater estate, or of an estate for some long term of years determinable on one or more life or lives, in manors, messuages, lands, tenements, or hereditaments, in England, Wales, or the town of Berwick-upon-Tweed, of the yearly value of 200*l.*; or shall be heir apparent of some person in like manner possessed to the yearly value of 400*l.*; a colonel, to the yearly value of 1000*l.* or heir apparent to the yearly value of 2000*l.*; a lieutenant-colonel, to the yearly value of 600*l.* or heir apparent to the yearly value of 1200*l.*; a major, to the yearly value of 400*l.* or heir apparent to the yearly value of 800*l.*; a captain, to the yearly value of 200*l.* or heir apparent to the yearly value of 400*l.* or he shall be a younger son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 600*l.*; a lieutenant, to the yearly value of 50*l.* or personal estate alone to the amount of 1000*l.* or real and personal estate together of the value of 2000*l.* or he shall be son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 100*l.* or of a personal estate alone to the amount of 200*l.* or real and personal estate together of the value of 3000*l.*; an ensign, to the yearly value of 20*l.* or a personal estate alone to the amount of 500*l.* or real and personal estate together of the value of 1000*l.* or he shall be son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 50*l.* or who shall be, or at the time of his death was, possessed of a personal estate alone to the amount of 1000*l.* or of real and personal estate together of the value of 1500*l.*; one moiety of which said estates, excepting of lieutenants and ensigns, shall be situate within the respective counties, ridings, or places, in which they shall be appointed to serve.

Provided, that the immediate reversion or remainder of and in manors, messuages, lands, tenements, or hereditaments, which are leased for one, two, or three lives, or for any term of years determinable on the death of one, two, or three lives, on reserved rents, and which are to the lessees of the clear yearly value of 300*l.* shall be deemed equal to an estate herein before described, of the yearly value of 100*l.* and fo in proportion. s. 10.

Also, a person, either at law or equity, for his own use and benefit, in possession of an estate for a term originally granted for 20 years or more, of an annual value (over and above all rents and charges payable in respect of the same) equal to the annual value of such an estate as is required for the qualification of a deputy-lieutenant and commissioned officer respectively, and situate as aforesaid, shall be deemed sufficiently qualified.

In the counties of Cumberland, Huntingdon, Monmouth, Westmorland, and Rutland, and in every county and place in Wales, the qualifications shall be as follow, and of the like estates as before mentioned:

A deputy-lieutenant's shall be of the yearly value of 150*l.* or he shall be heir apparent to an estate of the yearly value of 300*l.*; a colonel's of the yearly value of 600*l.* or he shall be heir apparent to the yearly value of 1200*l.*; a lieutenant-colonel's or major commandant's shall be of the yearly value of 400*l.* or he shall be heir apparent to the yearly value of 800*l.*; a major's shall be of the yearly value of 200*l.* or he shall be heir apparent to the yearly value of 400*l.*; a captain's shall be of the yearly value of 150*l.* or he shall be son of a person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 300*l.*; a lieutenant's shall be of the yearly value of 50*l.* or a personal estate alone to the amount of 600*l.* or real and personal to-

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gether of the value of 1000*l.* or he shall be the son of a person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 600*l.* or a personal estate alone to the amount of 1200*l.* or a real and personal estate together of the value of 2400*l.*; an ensign's, of the yearly value of 200*l.* or a personal estate alone to the amount of 300*l.* or real and personal together of the value of 600*l.* or he shall be the son of a person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 300*l.* or of personal estate alone to the amount of 600*l.* or real and personal together of the value of 1200*l.*; of all which respective estates (except those for the qualifications of lieutenants and ensigns), one moiety shall be within the respective counties or places in which such officers shall be respectively appointed to serve.

In the Isle of Ely, a deputy-lieutenant's shall be of the yearly value of 150*l.* or he shall be heir apparent to the yearly value of 300*l.*; a captain's shall be of the yearly value of 100*l.* or he shall be heir apparent to the yearly value of 200*l.* or he shall be a younger son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 300*l.*; a lieutenant's shall be of the yearly value of 30*l.* or personal estate to the amount of 600*l.* or he shall be son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 600*l.* or personal estate to the amount of 1200*l.*; an ensign's shall be of the yearly value of 20*l.* or personal estate to the amount of 300*l.* or he shall be the son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 300*l.* or personal estate to the amount of 600*l.*; one-half of all which estates (except those for the qualifications of lieutenants and ensigns), shall be situate or arising within the said Isle of Ely, or some other part of the county of Cambridge.

In all cities or towns which are counties within themselves, and have heretofore used to raise and train a separate militia within their respective liberties, and which are united with and made part of any county for the purposes of raising the militia only, the lieutenant hereof, or, where no lieutenant, the chief magistrate, shall appoint the deputy-lieutenants, and also the officers of the militia, whose number and rank shall be proportionable to the number of men which such city or town shall raise as their quota towards the militia of the county to which they are united for such purposes; and all powers and provisions made with respect to counties at large shall take place in the said cities or towns. And the qualification for a deputy-lieutenant shall be 150*l.* a-year as aforesaid, or a personal estate alone, or real and personal estate together, to the amount or value of 3000*l.* Field officer 300*l.* or personal estate alone, or real and personal together, to the value of 5000*l.* Captain 150*l.* a-year, or personal estate alone, or real and personal together, to the value of 2500*l.* Lieutenant 30*l.* a-year, or personal estate of 750*l.* Ensign 20*l.* a-year, or personal estate of 400*l.* One-half of all which real estates (except those for the qualification of lieutenants and ensigns) shall be within such city or town, or within the county to which such city or town is united for the purposes aforesaid. f. 9.

The whole number of private men to be raised, exclusive of certain places that are excepted, is 39,572; in various proportions for the several counties. Such numbers shall continue to be the respective quotas, until the 25th day of June, 1805, and from thence until other quotas shall be appointed by his majesty's privy council; and the respective quotas that shall at or after the expiration of the said first mentioned period, and also from time to time at or after the

expiration of every successive ten years after such period, be to appointed by the privy council, shall from the appointment thereof continue until other quotas shall be appointed under this act.

By this act provision is made for a "Supplementary Militia;" for in case of invasion, or imminent danger of it, and also in case of rebellion, the king may (the occasion being first communicated to parliament if sitting, or declared in council, and notified by proclamation, if there be no parliament sitting) by his proclamation order and direct, in addition to the number of militia-men aforesaid required to be raised under this act, any number of men not exceeding one-half of the aggregate number of the militia to be raised and enrolled. These men shall, in pursuance of such proclamation, be raised by the lieutenants and deputy-lieutenants. His majesty may also, by proclamation, disembody the supplementary militia; and the privates so disembodied, or those enrolled and not embodied, shall remain liable to serve and to supply all vacancies. The lieutenants and deputy-lieutenants shall hold meetings, and issue precepts for returning lists, and settling of lists, for proportioning the numbers in the several hundreds, &c., and the deputy-lieutenants shall cause the number appointed to serve to be chosen by ballot out of the list returned for every parish, &c. Parishes are allowed to offer volunteers without balloting.

The persons exempted from serving in the militia, or providing substitutes, are peers of this realm; commissioned officers in his majesty's other forces, or in any of his castles or forts; non-commissioned officers and private men serving in any of his majesty's other forces; commissioned officers serving, or who have served four years in the militia; members of either of the universities; clergymen; licensed teachers of any separate congregations; constables, or other such peace officers; article clerks, apprentices, seamen or seafaring men; persons mustering and doing duty in any of his majesty's dock-yards; persons free of the company of watermen of the river Thames; persons employed and mustered at the Tower of London, Woolwich Warren, the several gun-wharfs at Portsmouth, Chatham, Sheerness, and Plymouth, or at the powder mills, magazines, or the houses under the direction of the board of ordnance; and poor men who have more than one child born in wedlock. And by 43 Geo. III. c. 123. a person serving or having found a substitute in the army of reserve; and by 44 Geo. III. c. 54. any effective volunteer. Persons balloted, that refuse to serve or provide a substitute, shall forfeit 10*l.* which, by 43 Geo. III. c. 50. is increased to 15*l.* and at the expiration of five years, be liable to serve again, in person or by substitute. Those who have served are to be returned home in due time, so that they may reach the county to which they belong, if absent from it, by the expiration of their term; unless they shall consent to serve again. The enlisting of persons enrolled to serve in the militia, for service in his majesty's other forces, shall be deemed null and void. The militia are required to be trained and exercised by regiment or battalion, once in a year for twenty-eight days together (43 Geo. III. c. 19.): and the penalty of not appearing, or deserting, is the immediate payment of 20*l.* or imprisonment for six months, or till the money is paid. In case of actual invasion, or immediate danger of it, or rebellion in this kingdom, his majesty, communicating the occasion to parliament, if sitting, or declared in council, and notified by proclamation, if parliament be not sitting, may order the militia to be embodied, put under the command of general officers, and led to any part of the kingdom, but not to go out of it; and they shall be subject to the acts against mutiny

and

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and desertion. And any person not appearing, shall be liable to be apprehended and punished as a deserter; and if any person shall harbour or conceal any such militia man, he shall for every such offence forfeit 100*l*. From the date of his majesty's command for drawing out the militia into actual service, the officers and privates shall be entitled to the same pay as those of other infantry. Officers of the militia, during the time of service, are exempted from the office of sheriff, nor does the acceptance of a commission in the militia vacate the seat of any member returned to serve in parliament (42 Geo. III. c. 90.): and private men from highway duty, from parish offices, and serving in his majesty's other forces by sea or land. Militia men, when sick, are entitled to relief; and their destitute families to a weekly allowance out of the poor rates of the parish, &c. to which they belong. If they are maimed or wounded in actual service, they are entitled to the benefit of Chelsea-hospital: they may set up trades in any part of the kingdom.

As the militia of the city of London are now raised and regulated under and by virtue of the 36 G. 3. c. 92. and 39 G. 3. c. 82: And as the militia of the Tower Hamlets are now raised and regulated by the 37 G. 3. c. 75. and c. 25. and the same are thereby respectively made subject to certain provisions in the 26 G. 3. c. 107. by this act repealed; it is enacted, that, from and after the passing of this act, all and every the clauses, provisions, powers, authorities, punishments, bounties, penalties, forfeitures, matters, and things in this act contained, in relation to any persons, acts, matters, and things as to which the 26 G. 3. c. 107. or any of the clauses or provisions thereof, were in force or applicable as to the said respective militias, shall, from and after the passing of this act, be applied, practised, and put in full force as to all such persons, matters, and things, as far as the same can be applied, and are not contrary to any of the provisions of the said respective acts, or any or either of them: But nothing in this act contained shall be construed to extend to repeal any of the provisions of the said acts, or either of them, other than such as are in and by the said acts made subject to the rules and regulations of the 26 G. 3. c. 107.

Nothing in this act shall extend to the tinnerns in Devon and Cornwall; but the lord warden of the stannaries for the time being in pursuance of his majesty's commission in that behalf, and such as he shall commissionate and authorize under him, shall use the like powers, and array, assesse, arm, muster, and exercise the said tinnerns as has been heretofore used, and according to the ancient privileges and customs of the stannaries.

The lord warden of the cinque ports, two ancient towns and their members, and in his absence his lieutenant or lieutenants, shall put in execution within the same all the powers and authorities granted by this act, in like manner as his majesty's lieutenants of counties and their deputy-lieutenants may do; and may keep up and continue the usual number of soldiers in the said ports, towns, and members, unless he or they find cause to lessen the same; and the militia of the said ports, towns, and members, shall remain separate from the militia of the several counties within which the said ports, towns, and members are situate; and the said warden, or his lieutenant or lieutenants, shall, in pursuance of orders from his majesty, in the manner prescribed by the 13 and 14 Car. 2. notwithstanding one or more months pay advanced be not reimbursed, raise and draw out the soldiers into actual service, and cause the persons charged as by the said act to provide their soldiers with pay in hand, not exceeding one month's pay, in such manner as if all the pay advanced and provided had been reimbursed; and shall use the like powers,

and array, assesse, and arm, muster and exercise the said soldiers, and make assessments, and issue warrants for the assessments made or to be made for raising any trophy money, and for defraying the necessary charges of trophies, and other incident expences of the militia of the said ports, towns, and members, as hath been heretofore used, and according to their ancient privileges and customs; any thing in the said act or this act to the contrary notwithstanding.

By 48 Geo. III. c. 111. and subsequent acts, a particular species of force is ordered to be raised under the name of the "Local Militia;" the provisions of which act regulate the mode of raising the same kind of force in the Cinque Ports, Stannaries, and some other privileged places. The number of men ballotted and enrolled under this denomination in any county, division, or part of any county, shall not exceed such number as will, including the effective yeomanry and volunteers then serving in such county, &c. exclusive of supernumeraries above the establishment of such corps, serving without pay, who shall have been enrolled therein after the 1st of April 1808, amount to six times the respective original quota or proportion of militia of such county, &c. under the 42 Geo. III. c. 90. The deficiencies in effective yeomanry and volunteers in any county, &c. shall be supplied from time to time by local militia men; so that the number in the whole of the local militia under this act, and effective yeomanry and volunteers, shall be equal to six times the amount of such quota or proportion. Volunteers are allowed to enter, whether any order be given for supplying deficiencies or not, until the local militia be completed; and such volunteers shall receive two guineas each, payable on their respective enrolment. By 49 Geo. III. c. 40. this is repealed, except as to members of volunteer corps. Volunteers transferring themselves into the local militia, are not liable to serve in the regular militia, in consequence of any former ballot. The men to be raised under the act 48 Geo. III. c. 111. shall be ballotted out of the persons between the ages of 18 and 30 returned in the lists now existing, or hereafter returned, amended or corrected for the raising of the militia; and his majesty may direct the making out of new lists; and no person ballotted to serve in the local militia shall be allowed to find any substitute, or be entitled to any bounty or half bounty. Persons ballotted are to take a prescribed oath, and then to be enrolled to serve in the local militia of such county as a private local militia man for the space of four years. Persons unable to serve from illness or bodily infirmity shall be excused; and persons exempted are licensed teachers of any congregation in holy orders, or pretended holy orders, and not carrying on any other trade, or exercising any other occupation for his livelihood, except that of a school-master; such medical men actually practising as physicians, surgeons, or apothecaries; no person mustered, trained, or doing duty, or employed in his majesty's service in the Tower of London, the royal arsenal at Woolwich, or at any gun wharfs, or at any powder mills, powder magazines, or other storehouses belonging to his majesty, under the direction of the board of ordnance, shall be liable to be ballotted for the local militia, so long as they respectively continue within any of the aforesaid descriptions; and every person who shall have served, or is now serving in person in the additional military force, raised under an act passed in the forty-third year of the reign of his present majesty, or who shall have been ballotted, and have provided any substitute, or shall have paid any fine for not serving or finding a substitute in such additional force, shall be exempt from ballot and service in the local militia, in like manner, and for the same period, as such person was or is exempt from ballot and service in the regular militia during

during the continuance of the said act of the forty third year aforesaid; any thing in any act or acts of parliament to the contrary notwithstanding.

No person having served in the regular militia or such additional force, or provided any substitute, or paid any fine for not serving, or finding any substitute in the regular militia or such additional force as aforesaid, shall be entitled to exemption from being balloted under this act, for any longer period than four years after the expiration of his period of service, if he shall have served in person, or six years from the period of any such substitute being enrolled, or four years after having paid any such fine.

And no articed clerk or apprentice, nor any poor man who has less than three children born in wedlock, nor any person under the height of five feet four inches, who shall be of the height of five feet two inches, or upwards, shall by reason thereof, respectively be exempt under this act, notwithstanding they may, by reason thereof, respectively be exempt from the militia.

Provided that nothing in this act contained shall extend to authorize any apprentice ballotted under this act, to enlist in the army, navy, marines, or regular militia, or to enter as a volunteer in the local militia, without the consent of his master; provided also, that no ballot, enrolment, and service under this act, shall make void or in any manner affect any indenture of apprenticeship or contract of service between any master or servant, notwithstanding any covenant or agreement in any such indenture or contract, and no service under this act of any apprentice or servant shall be deemed to be an absence from service, or a breach of any covenant or agreement as to any service or absence from service in any indenture of apprenticeship or contract of service.

And every person claiming to be exempted from service under this act, upon payment of the fine of twenty pounds, or ten pounds, instead of thirty pounds, shall sign a declaration that the amount of his income does not exceed two hundred pounds or one hundred pounds as aforesaid, as the case may be, and shall deliver the same to the deputy-lieutenants before whom he shall appear to claim such exemption, or produce a certificate to the like effect, allowed by any commissioners under any act relating to the rates and duties arising on property, &c. or to any allowances made on any such rates and duties, within twelve months previous to the production of such certificate. Quakers, or united brethren, on production of certain certificates, shall not be enrolled, and may be adjudged to pay a proportion of the fines on persons ballotted, and not appearing. Persons serving in the local militia are entitled to the same exemptions as volunteers, and having served four years, are not liable to be ballotted for the regular militia for two years. Local militia officers shall not be exempt from serving the office of sheriff.

His majesty may order the local militia to be called out yearly to be trained; but they are not to be trained for more than 28 days in a year, nor to be ordered to march for that purpose further than some adjoining county. In case of invasion, or appearance of an enemy in force upon the coast of any part of the united kingdom, his majesty may order the local militia to be embodied and marched to any part of Great Britain, and continue there, so embodied, for any period not exceeding six weeks after the enemy shall have been prevented or repelled, or driven from the coast, or after any rebellion or insurrection shall have been suppressed. Lord lieutenants, &c. may call out the local militia for the suppression of riots, and those who do not appear are subject to certain penalties; but when so called out, they are not to be kept

assembled for more than 14 days in one year. Local militia assembled in time of war are subjected to the mutiny act. Every person enrolled to serve in the local militia shall, upon being assembled for training and exercise, be entitled to receive one guinea for the first year of his service, and 10s. 6d. for each succeeding year; and a further sum of one guinea in case such person shall be embodied under any order of council or proclamation. The local militia, when not drawn out and embodied, shall be entitled to the same pay, clothing and allowances, as the regular militia are when not embodied; and when drawn out and embodied, shall be entitled to the same pay, clothing, and allowances, for themselves and families, as his majesty's other militia forces when drawn out and embodied. Local militia men may enlist in the army, navy, or marines, or regular militia of the same county; and their vacancies shall be supplied as other vacancies. No person shall enlist a local militia man during the period of training, on penalty of 20*l.* Every county, hundred, or parish, is subject to a fine of 15*l.* for each man deficient at a certain period, but it shall be entitled to a return of part, for every man enrolled within a certain time.

MILITUM CURIA. See CURIA.

MILITUM *Expensis levandis.* See EXPENSIS.

MILTIUM, in *Botany*, an ancient name for a sort of corn or grass, remarkable for the abundance of its seeds; hence *Festus*, against whom we certainly can have no appeal, derives it from *mille*, a thousand. The plant of the Romans however was either a *Holcus*, or the *Panicum millicaeum*, or both; and our Linnæan genus has obtained this appellation from its resemblance in seed to those.—Linn. Gen. 33. Schreb. 47. Willd. Sp. Pl. v. 1. 358. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 75. Prodr. Fl. Græc. Sibth. v. 1. 44. Ait. Hort. Kew. ed. 2. v. 1. 147. Juss. 29. Leerf. 18. t. 8. f. 7.—Class and order, *Triandria Digynia.* Nat. Ord. *Gramina.*

Gen. Ch. *Cal.* Glume of two, nearly equal, ovate, tumid, pointed valves, inclosing a single flower. *Cer.* of two ovate valves, less than the calyx, permanent, finally cartilaginous, enfolding the seed; one of them smaller than the other. *Nectary* of two ovate, obtuse leaflets, tumid at the base. *Stam.* Filaments three, capillary, short; anthers oblong, versatile. *Pist.* Germen roundish; styles two, capillary; stigmas tufted. *Peric.* none, except the hardened and polished corolla, which closely invests the solitary roundish seed.

Eff. Ch. Calyx of two valves, single-flowered, tumid. Seed invested with the permanent hardened two-valved corolla.

1. *M. capense.* Cape Millet-grass. Linn. Mant. 185. Willd. n. 1.—“Panicum capillary. Calyx pointed. Corolla with a terminal curved awn.”—Native of the Cape of Good Hope. *Stems* four inches high, smooth and slender. *Leaves* narrow, clothed underneath with scattered hairs, and bearded at the top of their sheath. *Panicle* spreading every way; the flower-stalks finer than a hair. *Calyx* of two ovate, slightly swelling, pointed valves, of nearly equal length. *Seed* the length of the calyx. *Awn* terminal, curved, longer than the flower.” Such is the description Linnæus gives of this grass, which no botanist has ever been able to ascertain. Nothing in his herbarium bears this name, and yet there can be no doubt of his having described a specimen of his own. In writing the second *Mantissa*, he was often negligent about marking the plants he described. There is found in his genus *Avena*, confounded with the Spanish *A. Loeflingiana*, from which it is very distinct, a Cape specimen, which answers precisely to his description of the *Milium* in question, except that the calyx generally con-

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tains two florets, each with the twisted awn of an *Avena*. This however is as good a *Milium* as *M. paradoxum*, and we have no scruple in considering it as what Linnæus intended. The hairy sheaths and backs of the leaves, as well as the bearded stipula, are remarkable. The corolla is externally hairy. We cannot refer this grass to any in Thunberg's *Prodromus*.

2. *M. punctatum*. Dotted Millet-grass. Linn. Sp. Pl. 91. Amoen. Acad. v. 5. 392. Swartz. Obs. 37. Brown. Prod. Nov. Holl. v. 1. 188.—Panicle of alternate, linear, simple clusters. Lower flowers in pairs; upper solitary. Flower-stalks jointed. Outer valve of the corolla with a short awn. Native of Jamaica, in moist meadows. Swartz. Gathered by Mr. R. Brown near Port Jackson, as well as in the tropical part of New Holland; by Dr. Rottler at Madras. A pale upright grass, with the habit of a *Leersia*, or a *Paspalum*. Stem from one to two feet high, simple, round, jointed, smooth, leafy. Leaves broadish, striated, slightly roughish, with long smooth sheaths. Panicle a span long, erect, close, with hairy stalks. Flowers crowded, turned one way, ovate, acute, hairy. Corolla included, elliptical; its outer valve tipped, as Dr. Swartz and Mr. Brown observe, with a short rough awn. A purple stain, like a dark dot, under each flower, seems to have given rise to the specific name.

3. *M. lendigerum*. Panick Millet-grass. Linn. Sp. Pl. 91. Schreb. Gram. v. 2. 14. t. 23. f. 3. Engl. Bot. t. 1107. Fl. Græc. Sibth. v. 1. 49. t. 65. (*Agrostis australis*; Linn. Mant. 30. A. ventricosa; Gouan. Hort. 39. t. 1. f. 2. Knapp. t. 25. Gramen panicum serotinum, spicâ laxâ pyramidalî; Moris. v. 3. 189. n. 12. Herb. Bobart.)—Panicle close, somewhat spiked. Corolla awned, fringed.—Native of fields in the south of Europe, where water has stagnated; rather rare in England. Dr. Sibthorp found it on the sandy sea-shore of Asia Minor. It is annual, and flowers in the latter part of summer. The tufted fibrous roots produce many stems, from ten to twenty inches high. Leaves rough, with slightly swelling sheaths, and long, white, torn stipulas. Panicle pale, erect, acute, from one to four inches long, of innumerable crowded flowers; the base of their calyx tumid, smooth and polished. The permanent hardened corolla, which invests the seed, makes this species more certainly a *Milium*, than an *Agrostis*.

4. *M. compressum*. Compressed Millet-grass. Swartz. Ind. Occ. 183. Willd. n. 4.—Spikes two or three together, linear, on a very long stalk. Flowers alternate, close-pressed, awnless. Stem compressed, jointed in the middle.—Common in barren, rather alpine pastures in Jamaica; communicated by Dr. Swartz. Roots white, thread-shaped, perennial. Stems a foot high, or more, smooth, compressed quite flat, with a downy joint about the middle. Leaves long, linear, smooth, finely striated, radical; except one from the joint in the middle of the stem, which is broader, with a very long compressed sheath, bearded at its orifice. Flower-stalks from four to eight, from the sheath of the stem-leaf, about a foot long, thread-shaped, smooth, each bearing a pair of terminal, erect, linear, slender spikes, about two inches long, sometimes accompanied by a third at some distance, all together resembling some of the genus *Panicum*. The common stalk of each is zigzag and acutely angular. Flowers small, elliptic-oblong. Calyx ribbed, brownish, minutely fringed.

5. *M. digitatum*. Fingered Millet-grass. Swartz. Ind. Occ. 181. Willd. n. 5.—Spikes finger-like, about four together, nearly sessile. Florets acute, awnless, close-pressed, in pairs, directed one way. Leaves with cartilaginous ferratures.—Gathered by Dr. Swartz in barren

pastures, in the south of Jamaica. This appears to be still more akin to *Panicum* than the last, having sometimes a minute third valve to its calyx. The stem is a foot high, simple, slender, upright, smooth. Leaves lanceolate, short, striated, with compressed bearded sheaths. Spikes terminal, slender, somewhat spreading, two inches long, purplish. Flowers in pairs, rather unequal, on ferrated stalks.

6. *M. panicum*. Panick-like Millet-grass. Swartz. Ind. Occ. 179. Willd. n. 6.—Spikes rather finger-like, alternate, spreading, thread shaped. Flowers triangular, awnless, stalked, in pairs, turned one way.—In dry sandy ground, in the southern part of Jamaica. Swartz. Stem a foot high, simple, slender, erect, roundish, smooth. Leaves linear, smooth; their sheaths hairy at the orifice. Spikes three or four, slender, alternate, but near together, at the top of a long slender stalk, spreading. Flowers minute. Glumes of the calyx somewhat fringed; the outer one convex; the inner flat. Corolla the shape and size of the calyx, smooth, brown and shining, finally blackish, containing the very small seed.

7. *M. effusum*. Spreading Millet-grass. Linn. Sp. Pl. 90. Curt. Lond. fasc. 4. t. 12. Engl. Bot. t. 1106. Knapp. t. 19. Willd. n. 7. (Gramen miliaceum; Ger. em. 6.)—Flowers loosely panicked, awnless. Glumes elliptical, pointless, sheaths of the leaves smooth.—Native of shady groves, where the ground is rather moist, throughout Europe, flowering in June or July. Roots creeping, perennial. Stems erect, two or three feet high, leafy, smooth. Leaves light green, broad, flat, roughish at the edges; their sheaths smooth and naked, crowned by an oblong membranous stipula. Panicle erect, lax and widely spreading, composed of several alternate fascicles of variously branched capillary flower-stalks. Flowers solitary, pale whitish-green, elliptical, rather acute, but not pointed; their calyx-glumes even, finely ribbed, generally quite smooth, sometimes minutely roughish, never hairy nor fringed. Corolla at length horny, quite smooth and finely polished.

8. *M. confertum*. Close Millet-grass. Linn. Sp. Pl. ed. 1. 61. ed. 2. 90. Willd. n. 8. (Gramen paniculatum alpinum latifolium, paniculâ miliacâ sparsâ; Scheuchz. Agrost. 134.)—Flowers closely panicked, awnless. Glumes elliptical, pointless. Sheaths of the leaves smooth.—Native of Switzerland. Haller asserts under his n. 1525. Hist. v. 2. 243, that this proved, on an inspection of Scheuchzer's specimen, a mere variety of the last. We know it not.

9. *M. arundinaceum*. Reed-like Millet-grass. Sm. Prodr. Fl. Græc. Sibth. v. 1. 45. Fl. Græc. t. 66. (*Agrostis miliacea*; Linn. Sp. Pl. 91. Willd. Sp. Pl. v. 1. 363.)—Flowers loosely panicked. Corolla awned, smooth. Calyx taper-pointed. Sheaths of the leaves smooth. Stipula very short, abrupt.—Native of Siberia, Spain, Portugal, Zante, and the neighbourhood of Athens. The modern inhabitants of Zante call it γερδαζα. The root is perennial, tufted, with tortuous, downy, strong fibres. Stems numerous, two feet high, round, smooth, most knotty in their lower part. Leaves spreading, acute, roughish, with close smooth sheaths. Panicle rather turned to one side, slender, constructed much like that of *M. effusum*, but the flowers are only half as large, with ovate, tumid, long-pointed calyx glumes, often reddish. Corolla ovate, the outer valve tipped with a rough awn, twice its own length. Seed coated with the hardened corolla, which makes the plant a true *Milium*, its resemblance to *Agrostis spica-venti*, hinted by Linnæus, chiefly regarding its first aspect, and disappearing on a close examination.

10. *M. angulosum*. Little Angular-husked Millet-grass.—Flowers closely panicked, awnless. Glumes ovate, acute, strongly

strongly ribbed and furrowed. Sheaths of the leaves hairy.—Gathered in the Sandwich islands, by Archibald Menzies, esq. This has the habit of the three preceding, but is distinguished by the hairiness of the backs of the leaves, and of their sheaths. The joints of the stem are densely bearded. Panicle rather close, at least in the dried specimen, drooping. Flowers smaller than even those of *M. arundinaceum*, their glumes all strongly ribbed, bluntly pointed, destitute of awns, and of long hairiness.

11. *M. jetyum*. Bristly-husked Millet-grass.—Flowers closely panicle, pointed, awnless. Calyx fringed with long hairs. Sheaths of the leaves hairy.—Gathered in the Sandwich islands, likewise by Mr. Menzies. Root of strong smooth fibres, probably annual. Stem branched, a foot or more in height, with numerous joints, under each of which it is rough and hairy. Leaves and their sheath very hairy, light green. Panicle much like the last, but shorter. Glumes of the calyx strongly furrowed, with a short but stout point, scarcely amounting to an awn; they are remarkably fringed, with a few fine long spreading hairs, at each side. Corolla elliptical, awnless, very smooth, smaller than the calyx.

12. *M. tenellum*. Small Tumid Millet-grass. Cavan. Ic. v. 3. 37. t. 27. f. 1.—Panicle ovate, dense, awnless. Calyx-glumes inflated, almost hemispherical, very smooth. Sheaths of the leaves swelling, ribbed, smooth.—Gathered in sandy ground in Spain by the late Abbé Cavanilles, to whom we are obliged for a specimen. This is a little annual vernal grass, in habit, size and colour like *Aira caryophyllea*, along with which it grows. The stems branch from the bottom, and are clothed with a few short, narrow, involute leaves, with long, inflated, ribbed, purplish, smooth sheaths. The upper part of each branch is naked, round, smooth, rigid, purple, bearing an ovate, dense, glittering panicle, an inch long. Glumes of the calyx rugose at the keel, ovate, almost hemispherical, concave, enclosing the much smaller corolla, which latter we have not seen in an advanced state, so as to judge of the generic character. The aspect of the glumes of the calyx is that of a *Briza*.

13. *M. globosum*. Globose Millet-grass. Thunb. Jap. 49. Willd. n. 9.—Panicle spreading, awnless; its partial stalks annulated. Calyx-glumes ovate, obtuse. Sheaths of the leaves fringed.—Gathered by Thunberg in Japan. Stem simple, erect, a foot high or more. Leaves lanceolate, striated, rough, bordered, spreading, hardly a finger's length; their sheaths fringed at the edges and orifice. Panicle somewhat ovate, spreading; its stalks capillary, zigzag, marked with a yellow ring near the top. Calyx ovate, obtuse, awnless, smooth, brownish-green. Thunb.

14. *M. paradoxum*. Black-seeded Millet-grass. Linn. Sp. Pl. 90. Scop. Carn. t. 1. Schreb. Gram. v. 2. 50. t. 28. f. 2. Hort. Gram. Austr. v. 3. 16. t. 23. Willd. n. 10.—Panicle spreading. Calyx ovate, taper-pointed, ribbed. Corolla long-awned, smooth. Sheaths of the leaves smooth. Stipula elongated, acute.—Native of the south of France, and of Caniola. A tall, slender, reed-like grass, with narrow, smooth, rather glaucous, taper-pointed leaves, whose sheaths are close and smooth, and their stipula long, white, thin, membranous, acute, torn at the point. Panicle with feathery, spreading, slender, compound branches. Flowers very large in proportion to all the foregoing, one-third of an inch in length. Calyx-glumes purplish, ovate, concave, keeled and ribbed, with a long membranous point. Corolla half the length of the calyx, finally becoming black hard and polished, its outer valve tipped with a long rough awn.

15. *M. racemosum*. Racemose Millet-grass.—Flowers in a simple upright cluster. Calyx elliptical, acute, ribbed.

Corolla long-awned, hairy. Leaves lanceolate, with smooth sheath.—Sent by the Rev. Dr. Mulletberg from Lancaster in Pennsylvania. The stem is slender, leafy, smooth. Leaves lanceolate, flat, taper pointed, half an inch broad. Flowers the size of the last, four or five, in a slender, erect, perfectly simple cluster, with finely downy stalks. Calyx many-ribbed, green. Corolla at length brown, clothed with a few fine hairs, and not much polished, bearing a long rough awn.

16. *M. carulifolium*. Bluish Millet-grass. Desfont. Atlas. v. 1. 66. t. 12. Sibth. Prodr. Fl. Græc. Sibth. v. 1. 45.—Panicle spreading. Calyx ovate, taper-pointed. Corolla smooth, with a slight awn shorter than the calyx. Sheaths of the leaves smooth. Stipula elongated, jagged.—Gathered by Desfontaines in the fissures of rocks on mount Atlas, and by Dr. Sibthorp abundantly in the Greek islands.—This has nearly the appearance of *M. paradoxum*, especially the panicle, but the leaves are more narrow and glaucous, the corolla smaller, with only a short deciduous awn.

17. *M. villifolium*. Slaggy-flowered Millet-grass. Swartz. Prodr. 24. Obs. 383. Willd. n. 11. (*Andropogon inflexus*; Linn. Sp. Pl. 1480. (*Gramen avenaceum*, panicula minus sparsa, glumis allâ ferocâ lanigine obductis; Sloan. Jam. v. 1. 43. t. 14. f. 2.)—Panicle slightly spreading, awnless. Calyx clothed with long hairs. Sheaths of the leaves smooth.—Native of Jamaica and the Brazils. The leaves are lanceolate, roughish. Panicle of very numerous angular branches. Flowers about half the size of the last, remarkable for the long silky hairs that clothe the calyx. Awns none. This species seems rather to belong to the genus *Saccharum*. We know nothing of its corolla.

18. *M. ramosum*. Branching Millet-grass. Reiz. Obs. fasc. 6. 22. Willd. n. 12.—Stem branched, compressed, decumbent. Flowers closely panicle, hairy, usually in pairs. Sheaths of the leaves smooth.—Native of the East Indies. Stems leafy, downy at the joints. Leaves linear, narrow, quite smooth as well as their sheaths. Panicles several, on long stalks, from the sheaths of the upper leaves, each a span long, close, simply branched. Flower-stalks thickened and fringed at the top, with a black ring under each flower. Calyx lanceolate, hairy. Corolla smooth, polished, hard, the outer valve with a rigid point shorter than the calyx. Stigmas long, feathery, brown. The nature of the corolla being considered, the doubts of the accurate Retz, whether this grass should be reckoned a *Milium* or *Agrostis*, vanish.

MILIMUM Arundinaceum, a name by which some authors call the lachrymæ Jobi, or Job's tears.

MILIMUM Indicum, a name by which some authors call the maize, or Indian wheat.

MILK, in *Rural Economy*, and *Animal Chemistry*, is a white opaque fluid, secreted by a certain organ existing in all lactiferous animals. This secreting apparatus is differently situated in different animals. In women it is placed in the anterior part of the breast: in the cow, the mare, the ewe, and some others, it is situated in the lower part of the abdomen. While in the sow, the bitch, and several other quadrupeds, it is arranged through the whole course of the abdomen. The glandular substance which constitutes this organ is called the mamma: that projecting portion of the mamma, from whence the milk issues, being called the papilla, or nipple. The mammae are more or less in number in different animals, according to their number of young, some having as many as ten, others but one. In the human subject the mammae are two, each having one nipple. In the cow but one mamma, with four nipples. This organ in all animals appears destined to furnish their

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young with nourishment, till their own digestive organs are capable of performing their functions. Hence we find the period of lactation in animals to commence when they bring forth their young. This shews a strong connection between the secretion of milk, and the uterine action. All this may easily take place from the great connection between those branches of nerves which are bestowed upon the mammæ and the uterus.

At the age of puberty, the same nervous connection which may induce the uterine action, may, at the same time, be also bestowed upon the mammæ, causing them to be enlarged. During pregnancy, the nervous influence which is expended in forming the secretions for the growth of the fœtus, is, after delivery, transferred to the mammæ to produce lactation. Since secretion is dependent upon nervous influence, all substances moderately stimulating must facilitate the formation of milk. Some have supposed that the mammary artery is too small to furnish the quantity of milk which is furnished during lactation, and have thought that the chyle has been the principal source of this fluid. Fourcroy is of opinion, that the more substantial part of milk only is secreted from the blood, and that the aqueous part is furnished from the lymphatic vessels. What renders this idea plausible is, the very different states in which we find cows' milk from different kinds of food.

Milk, as an article of food, and its products, are of such importance in domestic economy, as to render all the improvements in its production and management particularly valuable. Since the milk of the cow is the most abundant and in general use, we shall confine the analysis of this substance to cows' milk.

Milk, when drawn from the cow, is of a yellowish-white colour, and is the most yellow in the beginning of the period of lactation. The viscidty of milk is something greater than that of water. In this state it has a peculiar but pleasant odour, which becomes less by exposure to the air, but returns when exposed to heat. Its taste is peculiar, rather agreeable, and somewhat saccharine. This, however, varies in different animals, and in the same animal, from particular kinds of food. Cabbage and turnips, when eaten by cows, give each their peculiar flavour to milk; and if they eat the smallest quantity of wild garlic, the milk and butter become perceptibly flavoured with its peculiar odour.

The specific gravity of milk, on the average, is about 1.035, water being 1. According to Brisson, whose authority on this physical property of bodies stands high, the following are the specific gravities of the milk of different animals.

Women's milk	-	-	-	1.0203
Cows'	-	-	-	1.0324
Goats'	-	-	-	1.0341
Mares'	-	-	-	1.0346
Affes'	-	-	-	1.0355
Ewes'	-	-	-	1.0409

The specific gravity of cows' milk varies from several causes. It is greatest at the beginning of lactation. It is the least when the milk appears the thinnest, or when it is the most aqueous. Cows feeding on grains, which is the case frequently in large towns, give poor milk, of little specific gravity.

When milk is exposed, in a cold situation more especially, it soon becomes covered with a substance, of greater viscidty than the milk, of a yellow colour, and having an unctuous feel. This is called cream. The quantity of this stratum bears different proportions to the milk under different circumstances. The milk now loses some of its viscidty,

and becomes of a bluer colour. In this state it is known by the name of skimmed milk. See DAIRYING.

When milk is exposed to heat, it first swells, and boils, it is said, at the temperature 199° of Fahrenheit. The surface soon becomes covered with a pellicle, which, if removed, is soon succeeded by another. This effect would take place till the residuum would become of an aqueous appearance, and incapable of furnishing any pellicle. This substance formed on the surface, is found no longer to possess the properties of milk, but is a peculiar substance called caseous matter, and is the same which constitutes the solid matter called cheese.

When milk is very slowly evaporated it forms a kind of thick extract of milk, which is called *franchipane*. This being mixed with sugar, almonds, and orange flowers, constitutes a sort of sweetmeat or custard.

When milk is distilled, a liquor comes over which has the odour of milk, but does not possess any other of its properties. It soon becomes putrid, depositing white flakes. If the heat be raised and continued, the thick part of the milk undergoes the destructive distillation. Empyreumatic oil, zoonic acid, and ammonia, are formed, with the disengagement of carburetted hydrogen gas. After the process, a voluminous coal is found in the still.

When milk has been exposed for several days in a temperature from 60° to 70°, it becomes a thick coagulum, so solid as not to be capable of pouring. During this change it is found that an acid has been formed which has separated the milk into two portions, the one the coagulable part, called curd, or caseous matter; the other the serous part, called whey. This change is also effected by other acids and by alcohol. The mineral acids are not proper for this purpose, because they re-dissolve the curd. Hence the vegetable acids are said to produce more curd than the mineral acids. The substance generally employed by cheesemakers to separate the curd, is a small portion of the inner coat of the stomach of the calf, which is salted, dried, and kept for that purpose.

By a particular management milk may be made to undergo the vinous fermentation, by which a quantity of alcohol is formed. It will be easy to infer, however, that this change is occasioned by the saccharine matter which it contains.

The Tartars have long been in the practice of making a vinous liquor, from which they distilled a species of brandy. This they procure from mares' milk, which is known to contain more sugar than that of the cow. By exposing it in large open vessels, the fermentation takes place. The mass being large, no doubt contributes to this change. A quantity both of the lactic and acetic acids are formed at the same time, which are separated from the vinous spirit by repeated distillations. The curdy or caseous part of milk above alluded to, is pressed into molds for cheese. (See DAIRYING and CHEESE.) Although acids separate the curd when added in small quantity, yet when in considerable quantity, the curd becomes re-dissolved. It is remarkable, that dilute vegetable acids separate the curd without re-dissolving it, while these acids, concentrated, dissolve the same. The curd is, on the contrary, easily dissolved by the dilute mineral acids, but not by these acids in their concentrated state.

Many other substances coagulate milk, such as alcohol, molasses, gelatine, and all astringent vegetables. The effect is supposed to arise from the affinity of the coagulating substance to water, the curd, which is principally albumen, having very little affinity for the same. The alkalis dissolve curd with great facility, owing to their great affinity

affinity for that substance. If ammonia be added to milk which has curdled, it will restore it to the appearance of milk, by dissolving the curd. Lime has also the power of dissolving curd. If quick-lime be boiled with curd into the form of pulp, it forms a most powerful cement. A similar property may perhaps belong to barytes and strontian.

When curd is freed from cream, kneaded, and pressed to expel the liquid matter, it becomes very hard with time, assumes a degree of transparency, and possesses many of the properties of dried coagulated albumen. Exposed to heat, it softens and becomes glutinous. The heat being continued, it becomes brown, exhales fumes, which contain ammonia; and lastly, inflames, leaving a dense coal behind.

The dried curd does not change by exposure to the air, but if it contains moisture, it soon putrefies, giving a disagreeable fetid odour. This change would take place in cheese, if it were not for muriat of soda, which also acts as a seasoning. It is likely that certain proportions of nitre, muriat of soda, and sugar, would make an agreeable seasoning for cheese, and would be a better preservative than salt alone.

If curd remains in cold water for a length of time, its properties become changed; it becomes fat, unctuous, and soft, having, at the same time, a fetid smell. It is, doubtless, to a certain degree of this change that we may attribute what is called the ripening of cheeses, by laying them in a damp place, and turning them from time to time. The cheeses absorb a quantity of water, and gain much weight. Their bulk is increased, and the interior is much altered, and is said to be ripe or mellow. Instead of allowing the cheese to absorb water, it is not uncommon for epicures to saturate it with port wine, or strong ale.

The white colour of milk, after the cream has been separated, is owing to the curd. This substance, in numerous minute particles in a state of coagulation, constitutes its white opaque appearance, since the whey, after the last portions of curd and cream have been separated, becomes transparent and limpid.

The clear liquor last mentioned is what we shall now examine under the name of whey, or the serum of milk. It differs from the whey of dairies, since the latter always contains a portion of oily matter, as well as some unseparated curd. To get the serum or whey sufficiently pure for chemical examination, a small quantity of fresh membrane of the calf's stomach must be employed to coagulate the milk. This will be more effectually done by boiling them together till the change takes place. Previous, however, to this, the milk must be perfectly freed from its cream, by placing it in a cool situation, and skimming it frequently. When the curd is separated, first strain it through a coarse cloth; afterwards filter it through unglazed writing paper.

In this state the whey is limpid, and of a greenish-yellow colour. It has a peculiar sweetish smell when hot, which it loses on cooling. Its taste is rather sweet, and not disagreeable. When exposed to a boiling heat, a whitish scum rises to the surface, the liquid becoming rather turbid. If it be boiled a little while, and then set to cool, that which rendered it turbid falls, leaving the liquor clear, and almost as colourless as water. This residuum last named, is a small portion of curd which remained in the whey. The clear liquor thus obtained is of less specific gravity than milk, being 1.0193. By slow evaporation, it affords crystals of a substance much resembling sugar, but much less soluble. This has been called sugar of milk. Near the end of the evaporation, crystals of the muriats of potash and soda are deposited, and some phosphat of lime.

The circumstance of muriat of potash being afforded in this analysis, is strongly in favour of the idea that milk is not wholly secreted from the blood, since potash is never found in that fluid. The sugar of milk is in the form of crystals of a brown-yellow colour. These, when purified by several successive solutions and evaporations, become white, of a prismatic shape, or rather paralleloipedons.

This substance is soluble in about four parts of boiling water, and twelve of cold. It is manufactured and sold in Switzerland, under the name of salt or sugar of milk.

When treated with nitric acid, with a view to obtain oxalic acid, a smaller portion of this acid is obtained than from the same weight of sugar. Scheele, however, who first made this experiment, found that a quantity of white powder was separated, which he found to be a peculiar acid, and which he denominated the acid of sugar of milk. This has been altered into *Saccharic acid*, which see. Fourcroy found that the same acid was afforded by treating gum arabic with nitric acid. On this account he called it the mucous acid. It was from this latter fact that this sagacious chemist inferred that sugar of milk was a substance of a middle nature between gum and sugar. It is the opinion of Deyeux and Parmentier, that sugar of milk consists of sugar combined with the saccharic acid.

The mother water, from which the sugar of milk is obtained, is of a brown colour, and of a thick gluey consistence, which, on cooling, assumes the appearance of animal jelly. If this be diluted and slowly evaporated a second time, an additional quantity of the muriat of potash is separated in crystals, and also of phosphats of soda and lime. The presence of phosphat of lime in the serum of milk, may be detected both by precipitating its acid and its base. If oxalat of ammonia be poured into the clear whey, a precipitate of oxalat of lime is formed. On the other hand, when nitrat of lead or nitrat of mercury is employed as a test, the phosphats of lead and mercury are precipitated. The great quantity of phosphat of lime in milk, in order to supply oxidizing matter, so essential to young animals, is a remarkable provision of nature.

The remaining part of the whey chiefly consists of gelatine. If when whey has been evaporated to the consistency of syrup, a quantity of alcohol be poured upon it, a starchy precipitate is formed, consisting of gelatine and sugar of milk. The gelatine may be separated by tannin. Thus we see that whey consists of sugar of milk, gelatine, muriats of potash and soda, and phosphats of lime and soda, with a certain quantity of water. It is also said that whey contains sulphat of potash, and the phosphats of iron and magnesia.

Whey is exceedingly liable to turn sour. The acid which is formed, was thought by Scheele to be what he termed the lactic acid; the same which is formed when milk coagulates spontaneously. It is, however, now found to be the acetic acid, arising from the acetous fermentation which has succeeded the vinous; the latter being induced by the saccharine matter which the milk contains.

Having given the analysis of milk deprived of cream, or the oily part, we shall now give some account of the latter, which is also denominated the butyraceous part of milk.

Cream, the mode of separating which we have already given, gradually thickens by exposure to the air, and ultimately becomes a soft unctuous solid, called cream cheese. When cream is exposed to its boiling heat, and oil soon appears upon its surface, the rest of the cream consists of caseous matter and whey. This oil, by the operation of churning, is converted into a solid fatty substance, so well

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known under the name of butter. See **BUTTER** and **DAIRY-ING**.

If milk, when newly taken from the cow, be agitated for some time, the oily matter becomes concrete, and is dispersed through the fluid in small grains. These being collected, constitute butter. It was formerly thought, that the agitation of the milk merely collected and pressed the small particles of butter together. It is now believed that the butter does not exist ready formed in the milk, but in a state of oil, which requires to combine with oxygen before it can become hard. This idea is rendered plausible by several circumstances. The more acid the cream has become before churning, the sooner butter is formed. It has also been ascertained, that the presence of fresh atmospheric air facilitates the formation of butter. The frequent instances which occur in practice, of not getting butter at any rate, may doubtless be traced to the want of a supply of oxygen. This may be a hint of some importance in the management of large dairies.

When butter has been obtained from cream, the liquid remaining consists of milk, containing minute particles of butter. If cream has been kept till it shall have become sour, the curd becomes precipitated. In this case it becomes of a thicker consistence. This is known by the name of butter-milk.

Butter, prepared as above, is of a yellow colour, and more yellow as the cream has been kept longer. Its taste is very unlike any other fatty substance, and extremely agreeable. This, however, is not always the case, since its flavour is sometimes altered by the food of the cow. When it has been exposed to the air for a certain time, it acquires a rancid taste. Its flavour sometimes becomes changed, and rendered disagreeable, by a portion of the butter-milk which has not been washed out of it.

Butter, when newly made, fuses in about 99° of Fahrenheit. Its specific gravity is about .96, water being 1. When it is exposed to the heat of boiling water in a glass tube, a portion of curd and whey is separated from it. By this process the butter becomes almost transparent; but it will be found to have lost much of its agreeable taste. Hence it would seem, that its flavour either depends upon the small portion of serum and curd, which is always a constituent of butter, or that its aroma is expelled by the heat. Butter is not changed by a heat which merely fuses it.

When butter is distilled from a small glass retort, some drops of water first appear, and the greater part of the butter comes over. This is accompanied by a disagreeable smell, and an inflammable gas. A small quantity of coaly matter is left at the bottom of the retort, which contains phosphat of lime. By repeated distillation, the oily substance which comes over becomes lighter and more volatile. This is probably owing to the separation of carbon. If the retort be large, the oxygen, being more abundant, causes the formation of more water with the hydrogen from the butter. Another portion of the hydrogen and a portion of carbon combine with the oxygen, forming sebatic acid.

Butter combines with most of the substances which combine with fat, such as sulphur, phosphorus, the alkalies, and several metallic oxyds.

By collecting the different parts which have been given, we shall find the constituents of cows' milk as follows: curd; serum or whey, which consists of water; gelatine; sugar of milk, or mucaceous saccharine matter; muriats of soda and potash; sulphat of potash, and the phosphats of lime; magnesia and iron; butter, consisting of an oxygenated oil, combined with a little serum and caseous matter.

In cases where the milk of animals is taken away periodi-

cally by milking, as in the cow, the supply is continued, and hence the great value of that animal, in particular, to man, who is indebted to her for three of the most useful articles of food, milk, butter, and cheese. But in respect to the quality of milk, it differs considerably in different circumstances and situations, and from the manner in which the cows are fed and managed. In order to have an abundant supply, it is necessary to have recourse to constant plentiful feeding of the animals with rich luxuriant green food of different sorts, given in a proper varied manner, as well as other kinds of food. In comparing the qualities of the milk of different cows, the time in which they have been in milk should be fully considered, as the milk, soon after calving, is always much thinner than it is afterwards. The properties of milk, so far as they regard the dairy, and the management of it in respect to the making of butter and cheese, will be taken notice of in another place. In cases where the mother is lost, or the young animal is too feeble to have recourse to her teats, milk with sugar, gruel, and a small quantity of spice, is sometimes given as a means of support. See **DAIRYING**, **LACTOMETER**, **BUTTER**, and **CHEESE**.

The milk of different animals differs considerably.

Women's milk is much thinner than cows' milk; is of a bluer colour, and contains more saccharine matter. It does not afford butter till some time after delivery, although it contains some oily matter. It contains less curd than the milk of the cow. The milk of women is liable to greater changes from disease than any other. Spasms, which are not uncommon to those who suckle, so change the milk, as to be unpleasent and unwholesome to the infant. It is observed by Deyeux and Parmentier, that when the milk is drawn from the breast at short intervals, it is constantly watery and poor, and is of but little service to the infant. They therefore recommend, that the intervals of suckling should be as great as possible, without inconvenience to the infant or the nurse.

The milk of the ass is also different from cows' milk: it contains more saccharine matter, and, like women's milk, is thinner than that of the cow. There is nothing in this milk more than in others, to warrant the medical qualities which some ascribe to it.

Asses' milk is said to be a great beautifier and preserver of the skin. Poppæa, wife of the emperor Nero, used it for that purpose; having four or five hundred asses constantly in her retinue, to furnish her every morning with a fresh bath. The receipt for making what is called artificial asses' milk is as follows:

R limac. terrest. contus. xviii. Rafur. C. Cervi, Hordei perlati, Rad. eryngii, sing. unc. i. aquæ puræ lib. vi. coque leni igne in vase figulino vitriato ad lib. iii; dein cola et adde syrupi balsamici fescunciam. Capiat æger mane et vesperi quotidie unc. iv. hujus liquoris mistas cum lactis vaccin. recentis p. æ. Med. Transf. vol. ii. p. 341.

Goats' milk is something thicker, and appears richer than even the cows' milk. It has a peculiar aroma, which, from the black goat, is so strong as to be disagreeable. It affords butter and cheese: the former is of a whiter colour than that from the cow, and is said to keep longer.

Ewes' milk has the appearance of cows' milk. It affords a much larger quantity of cream, forming a soft and very fusible butter. Its caseous matter is very soft and unctuous, and is sometimes mixed with that from the cow, to give it a rich appearance.

Mares' milk is the next to women's milk in quantity of saccharine matter: it affords little cream; and does not easily coagulate.

coagulate. It is from the quantity of sugar contained in this milk, that it affords alcohol by fermentation.

Milk, in the *Wine Trades*. The coopers know very well the use of skimmed milk, which makes an innocent and efficacious forcing for the lining down of all white wines, cracker, and small spirits; but it is by no means to be used for red wines, because it discharges their colour. Thus if a few quarts of well skimmed milk be put to a hoghead of red wine, it will soon precipitate the greater part of the colour, and leave the whole nearly white; and this is of known use in the turning red wines, when pricked, into white; in which a small degree of acidity is not so much perceived.

Milk is, from this quality of discharging colour from wines, of use also to the wine-coopers, for the whitening of wines that have acquired a brown colour from the cask, or from having been hastily boiled before fermenting; for the addition of a little skimmed milk in these cases precipitates the brown colour, and leaves the wines almost limpid, or of what they call a water whiteness, which is much coveted abroad in wines as well as in brandies.

MILK-Abcess. See *Abcess of the Breast*.

MILK-Fever, a fever frequently attacking women the second or third day after being delivered, occasioned probably by some circumstance attending the secretion of the milk into the breasts. It is of short duration, and not attended with danger. For the treatment and cure, see *LACTATION, Natural*.

MILK of the Moon, lac lune, a name given by naturalists to fossil agaric, a white light marble. See *LAC lune*.

Some say, it is chiefly found in silver mines, and that it is a flower sublimed from the ore of that metal; whence its denomination, *flower of silver*.

MILK of Sulphur, lac sulphuris, a preparation of flowers of sulphur and salt of tartar; prescribed by physicians as a sudorific. See *SULPHUR Precipitatum*.

MILK-Vetch, in *Botany*. See *ASTRAGALUS*.

MILK-Vetch, *Barlard*. See *VETCH*.

MILK-Vetch, or *Coat's-thorn*, in the *Materia Medica*. See *TRAGACANTH*.

MILK, Virgin's, lac virginale, composed of rock alum, spring-water, lycharge, and vinegar; used as a cosmetic, to drive in pimples, and check any cutaneous eruptions, by its cooling, restringent quality. See *VIRGIN'S Milk*.

MILK-Water. See *WATER*.

MILK-Wood, in *Botany*. See *TRUMPET-flower*.

MILK-Wort. See *POLYGALA*.

MILK-Wort, or *Wart-wort*. See *SPURGE*.

MILK-Wort, Sea. See *GLAUX*.

MILK, in *Geography*, a river of Jamaica, which runs into the sea, four miles N.W. of Maccree bay.

MILK Cove, a creek of Ireland, on the S.E. side of the entrance into Ross bay, near Gully Head.

MILK Haven, a small harbour of Ireland, in the county of Sligo, S. of Donegal bay.

MILK River, a river of Canada, which runs into lake Erie, N. lat. 42° 28'. W. long. 82° 22'.

MILKING, the means or operation of drawing the milk from the cow or other animal. The proper milking of cows is a matter of much consequence to the cow and dairy farmer. And it has been observed, that more care is necessary in this business than is generally supposed, in order to obtain the largest possible quantity of milk. "On the physiological principle of the secretions of animals being increased in proportion as the secreted fluid is more frequently withdrawn, it has been, it is said, recommended to have recourse to more frequent milkings in order to augment the quantity

of that fluid in cows. And there can be little doubt but that by accustoming the secretory organs to a more frequent secretion, such a habit may be established in them as will afford a large proportion of milk in a given time. But in order to effect this in the most perfect manner, it will be necessary to have the cows highly fed, and to observe the greatest regularity and exactness in the periods of milking, and to be careful that every drop of milk is drawn away each time, and without due regard in these respects the desired effect will not be produced. This is fully shewn to be the case by the few experiments that have been instituted with the view of deciding the matter; as while the cows were continuing the more juicy spring food, there appears to have been an increase in the quantity of milk both by three and four milkings in the day; but in the autumnal season there seems to have been rather a decrease under the same circumstances." But "in order to ascertain the advantages to be obtained in this way with accuracy, the following experiments were made by Mr. Marco, and the results stated in the twelfth volume of the *Annals of Agriculture* to be these:

		Pints.
1789—May 21,	First meal	9½
	Second ditto	13
		22½
22,	First meal	13
	Second do.	8
	Third do.	5
		26
23,	First meal	12
	Second do.	7
	Third do.	6
	Fourth do.	1
		26
October 22,	First meal	11
	Second do.	6
		17
23,	First meal	11
	Second do.	3
	Third do.	3
		17
24,	First meal	10
	Second do.	1½
	Third do.	1½
	Fourth do.	3
		16

But it is evident, that "such trials, to afford any satisfactory conclusions, should have been continued for a much greater length of time, being varied considerably in the times of milking, and nicely compared with the nature and quantity of the food employed; as it is only by ascertaining how much depends upon the simple operation of taking away the milk, and how much upon the quality and proportion of food that is taken in, that the question can be fairly decided.

decided. The deterioration of the animal should also be considered. It is not to be supposed that merely increasing the number of milkings for a few days can have much influence in altering the state of the secretion in the animals. Some, with the intention of increasing the quantity of milk, have recommended milking, when the cows are fully fed in the summer season, three times in the course of the day at equal distances, as the convenience of the business will admit as the most proper. Early in the morning, about the middle of the day, and in the evening before it is too late. The exact proportion of increase in the milk that may be produced in this way over that of milking in the morning and evening only, which is the usual mode, has not, that we know of, been ascertained with any degree of accuracy; but some suppose that it may approach to nearly one-half of the whole, while others contend that it cannot be any thing near so much. If a third were gained, by such means, it would amply repay the cow-keeper for his additional trouble and expence."

With respect to "the method of milking adopted by cow-farmers in most cases, it is only to have their milking performed twice in the course of twenty-four hours. In such cases the most proper times would seem to be about seven o'clock in the morning, and five in the afternoon; but in the neighbourhood of London, according to the Report of Middlesex, and in other large towns, it is the practice to have this work performed from four to half-past six in the morning, and from half-past one to three in the afternoon. It is, therefore, probable, that more frequent milking in the business of cow-farming, especially when conducted upon an extensive scale, would not only be inconvenient but impracticable. In such cases it is supposed, that all that can be done is, perhaps, that of having the operation executed with as much care as possible, in respect to the whole of the milk being taken away each time, and by persons who are careful and perfectly accustomed to the work. Where this is neglected, much loss may be sustained not only in the immediate produce of the milk, but in the cows becoming much more quickly dry, as well as their being more subject to affections of the udder. The best advice is, to have the business performed in an expeditious manner, in regard to the whole of the animals, and with the utmost attention in respect to cleanness. A sufficient number of persons should of course be employed in proportion to that of the cows. An expert milker is capable of performing the operation on from six to seven or eight cows in the course of an hour." It is proper that the number of milkers employed should constantly be such as to have the business performed in about the course of an hour at the farthest. See DAIRY, and DAIRYING.

MILKING Pail, in *Rural Economy*, the vessel made use of for containing the milk as it is drawn from the cow. These pails are made of wood, and sometimes hooped with iron at the bottom. They are made of different sizes, and should be kept well seasoned by frequent scalding.

MILKNESS, a provincial term applied to a dairy. See DAIRY.

MILKOVAIA DERVINA, in *Geography*, a town of Kamtschatka, settled by a colony of Russians; 15 miles N. of Verchnei Kamtschatka.

MILKY GROTT. See GROTT.

MILKY Way, *via lactea*, or *galaxy*. See GALAXY.

MILL, JOHN, in *Biography*, a learned English divine and biblical critic, was born at Shapp, in Wiltmorland, about the year 1645. He was entered of Queen's college, Oxford, where he took his degrees in arts, and of which

college he afterwards became a fellow and eminent tutor. As soon as he entered into holy orders he distinguished himself by his pulpit talents, and was much followed as an eloquent preacher. He published one of his sermons preached at St. Martin's-in-the-Fields about the year 1676, intended to shew that there was no sort of foundation for the worship of the Virgin Mary, and at this period the bishop of Exeter appointed Mr. Mill one of his chaplains, and gave him a prebend in his cathedral church. In 1680 he took his degree of B.D., and in the following year was presented by his college to the rectory of Blechingdon, in Oxfordshire, at the same time proceeded doctor in divinity, and was nominated chaplain in ordinary to king Charles II. Dr. Mill had been some years employed in preparing for the press his valuable edition of the "New Testament," which is now as rare as it is excellent. This great work he undertook by the advice and with the encouragement of Dr. Fell, bishop of Oxford, at whose expence it was to be printed. At an early stage of the business the liberal-minded prelate died, and his executors being unwilling to proceed with the work, Dr. Mill, with a noble spirit, refunded to them the sums of money which his departed friend had advanced, and determined to complete it at his own risk. To this work, which cannot fail to transmit his name with distinguished honour to posterity, he devoted the thirty last years of his life, with the most patient assiduity, as well as scrupulous care, and he had the satisfaction of seeing his useful labours brought to a close, and the fruits of them presented to the world. In 1685, Dr. Mill was elected principal of St. Edmund's hall, Oxford, which preferment was the more acceptable, as it gave him an honourable settlement in the university, and enabled him to prosecute his design to the utmost advantage. In 1704 he was, by the interest of Dr. Sharp, archbishop of York, presented with a prebendary of Canterbury. His work was published in 1707, an event which he did not survive more than a fortnight, being carried off by an apoplectic stroke in the sixty-third year of his age. Of his great learning his work gives ample proofs: it is founded upon, and is an improvement of, Robert Stephens' elegant folio edition, published at Paris in the year 1550, which has in the inner margin the collation of sixteen manuscripts, and of bishop Fell's neat and accurate edition, published at Oxford in 1675. To the various readings of the former, Dr. Mill added those of sixteen MSS. out of the English Polyglot bible. He also collated himself all the valuable MSS. in England, and procured collations of the most esteemed ones at Rome, Paris, Vienna, and other places, as well as of the ancient translations of the New Testament. This edition of the New Testament was reprinted at Rotterdam in 1710, in folio, by the learned Kulter, who augmented it with the collation of twelve new MSS. It was also reprinted at Leipzig in 1723. Dr. Mill's labours gave very general satisfaction to the learned of this country, and to biblical scholars every where; but there were some few who doubted if it might not tend to unhinge the minds of people, by countenancing the notion that the text was precarious, as the author had collected thirty thousand various readings. On this account Dr. Whitby made it the subject of an attack, which was ably answered by Mr. Whiston, and still more fully by Dr. Bentley, in the thirty-second section of his "Remarks" upon it, under the assumed title of "Phileatherus Lipsiensis." Biog. Brit.

MILL Bay, in *Geography*, a bay on the E. coast of the island of Stronfa. N. lat. 58° 59'. W. long. 2° 20'.

MILL Creek, a river of Virginia, which runs into the Ohio, N. lat. 40° 36'. W. long. 80° 36'.

MILL Gaut, a town of Hindoostan, in the circar of Hindia, on the left bank of the Nerbudda; 10 miles E. of Hindia.

MILL Islands, four small islands in Hudson's bay. N. lat. $64^{\circ} 30'$. W. long. $78^{\circ} 30'$ to $79^{\circ} 40'$.

MILL, in propriety, denotes a machine for grinding corn, &c. but, in a more general signification, is applied to all machines whose action depends on a circular motion.

Of these there are several kinds, according to the various methods of applying the moving power; as water-mills, wind-mills, mills worked by horses, &c.

Few people are ignorant, that corn is ground by two mill-stones, placed one above the other, without touching.

The lower mill-stone is immoveable, but the upper one turns upon a spindle. The opposite surfaces of the two stones, which act to grind the corn, are not plane or flat; but the upper one is hollow, and the under one swells up; each of them being of a conic figure, whose axis indeed is very short, in proportion to the diameter of its base; for the upper one being six feet in diameter, is hollowed but about one inch at its centre; and the lower one rises but about three-fourths of an inch. These two mill-stones come nearer and nearer towards their circumference, whereby the corn that falls from the hopper has room to insinuate between them as far as two-thirds of the radius, which is the place where it begins to be ground, and where it makes the greatest resistance that it is capable of; the space between the two stones being in that place about but two-thirds or three-fourths of the thickness of a grain of corn. But as the millers have the liberty of raising or sinking the upper stone a little, they can proportion its distance from the lower one, according as they would have the flour finer or coarser.

In order to cut and grind the corn, both the upper and under mill-stones have channels or furrows cut in them, proceeding obliquely from the centre towards the circumference. And these furrows are each cut perpendicularly on one side, and obliquely on the other, into the stone; which gives each furrow a sharp edge, and in the two stones, they come, as it were, against one another, like the edges of a pair of scissars; and so cut the corn to make it grind the easier, when it falls upon the places between the furrows. These are cut the same way in both stones when they lie upon their backs, which makes them run cross-ways to each other, when the upper stone is inverted by turning its furrowed surface towards that of the lower. For if the furrows of both stones lay the same way, a great deal of the corn would be drove onward in the lower furrows, and so come out from between the stones without ever being cut. When the furrows become blunt and shallow by wearing, the running stone must be taken up, and both stones new dret with a chissel and hammer. But, by this repeated operation, their thicknesses, and consequently their weight, diminish; and it is observed, that when they come to have but three-quarters, or half of the thickness which they had when new, they produce but three-quarters or half the flour which they yielded at the beginning.

The circular motion of the upper mill-stone brings the corn out of the hopper by jerks, and causes it to recede from the centre towards the circumference, where, being quite reduced to flour, it is thrown out of the mill, by the centrifugal force of the stone, through a hole provided on purpose.

The diameter of common mill-stones, according to Dr. Defaguliers, is from five to seven feet, and their thickness, twelve, fifteen, or eighteen inches: they last thirty-five or forty years, and when they have been long used, so that

their thickness is considerably diminished, they are cut anew, to give their surface a contrary figure to what they had before; so that the upper mill-stone is made the lower.

In water-mills, the momentum of the water is the moving power, and the attrition of the two stones in grinding is the force to be overcome. Of these there are two kinds, *viz.* those where the force of the water is applied above the wheel, and those where it is applied below the wheel; the former being called over-shot, and the latter under-shot mills; and to these we may add a breast-mill, where the water strikes against the middle of the wheel.

In a common breast-mill, where the fall of water may be about ten feet, A A, (*Plate XXIII. Mechanics, fig. 1.*) is the great wheel, which is generally about seventeen or eighteen feet diameter, from *a* the outermost edge of any float board, to *b*, that of its opposite float. To this wheel the water is conveyed through a channel, and falling upon the wheel, turns it round. On the axis B B, of this wheel, and within the mill-house, is a wheel D, about eight or nine feet diameter, having sixty-one cogs, which turn a trundle E, containing ten upright staves or rounds; and when this is the number of cogs and rounds, the trundle will make $6\frac{1}{10}$ revolutions for one revolution of the wheel. The reason of adding an odd cog, called the hunting cog, to the wheel, is this; that, as every cog comes to the trundle, it may take the next staff or round behind the one which it took in the former revolution, and thus it will wear all the parts of the cogs and rounds which work upon one another equally, and to equal distances from one another in a little time; and make a true uniform motion throughout the whole work. The trundle is fixed upon an iron axis called the spindle, the lower end of which turns in a brass foot, fixed at F, in the horizontal beam S T, called the bridge-tree; and the upper part of the spindle turns in a wooden bush fixed into the lower mill-stone, which lies upon beams in the floor Y Y. The top part of the spindle above the bush is square, and goes into a square hole in a strong iron cross, *abcd*, (*fig. 2.*) called the rynd; under which, and close to the bush, is a round piece of thick leather upon the spindle, which it turns round at the same time as it does the rynd. The rynd is let into grooves in the under surface of the running mill-stone G, (*fig. 1.*) and so turns it round in the same time that the trundle E is turned round by the cog-wheel D. This mill-stone has a large hole quite through its middle, called the eye of the stone, through which the middle part of the rynd and upper end of the spindle may be seen; whilst the four ends of the rynd lie hid below the stone in their grooves.

The end T of the bridge-tree T S (which supports the upper mill-stone G upon the spindle) is fixed into a hole in the wall; and the end S is let into a beam Q R called the brayer, whose end R remains fixed in a mortise: and its other end Q hangs by a strong iron rod P, which goes through the floor Y Y, and has a screw-nut on its top at O; by the turning of which nut, the end Q of the brayer is raised or depressed at pleasure; and, consequently, the bridge-tree T S and upper mill-stone. By this means the upper mill-stone may be set as close to the under one, or raised as high from it, as the miller pleases. The nearer the mill-stones are to one another, the finer they grind the corn; and the more remote from one another, the coarser.

The upper mill-stone G is inclosed in a round box H, which does not touch it any where; and is about an inch distant from its edge all around. On the top of this box stands a frame for holding the hopper *kk*, to which is hung the shoe I, by two lines fastened to the hind-part of it, fixed upon hooks in the hopper, and by one end of the

crook.

crook-string K fastened to the fore-part of it at *i*; the other end being twisted round the pin L. As the pin is turned one way, the string draws up the shoe closer to the hopper, and so lessens the aperture between them; and as the pin is turned the other way, it lets down the shoe, and enlarges the aperture.

If the shoe be drawn up quite to the hopper, no corn can fall from the hopper into the mill; if it be let a little down, some will fall: and the quantity will be more or less, according as the shoe is more or less let down. For the hopper is open at bottom, and there is a hole in the bottom of the shoe, not directly under the bottom of the hopper, but forwarder towards the end *i*, over the middle of the eye of the mill-stone.

There is a square hole in the top of the spindle, in which is put the feeder *e* (fig. 2.); this feeder (as the spindle turns round) jogs the shoe three times in each revolution, and so causes the corn to run constantly down from the hopper, through the shoe, into the eye of the mill-stone, where it falls upon the top of the rynd, and is, by the motion of the rynd and the leather under it, thrown below the upper stone, and ground between it and the lower one. The violent motion of the stone creates a centrifugal force in the corn going round with it, by which means it gets farther and farther from the centre, as in a spiral, in every revolution, until it be thrown quite out; and, being then ground, it falls through a spout M, called the mill-eye, into the trough N. When the mill is fed too fast, the corn bears up the stone, and is ground too coarse; and besides, it clogs the mill so as to make it go too slow. When the mill is too slowly fed, it goes too fall, and the stones, by their attrition, are apt to strike fire against one another. Both which inconveniencies are avoided by turning the pin L backwards or forwards, which draws up or lets down the shoe; and so regulates the feeding as the miller sees convenient.

Sometimes, where there is a sufficient quantity of water, the cog-wheel in fig. 1. turns a large trundle, on whose axis is fixed a horizontal wheel, with cogs all around its edge, turning two trundles at the same time; whose axis or spindles turn two mill-stones. When there is not work for them both, either may be made to lie quiet, by taking out one of the staves of its trundle, and turning the vacant place towards the horizontal cog-wheel. And there may be a wheel fixed on the upper end of the great upright axle of this wheel for turning a couple of boulting-mills; and other work for drawing up the sacks, fanning and cleaning the corn, sharpening of tools, &c. As the water acts upon an over-shot mill both by impulse and weight, so does it likewise upon a breast-mill, or that where the water comes upon the breast or middle part of the wheel: and here, though the weight of the water is not so great as in the over-shot mill, being contained in the buckets of the lower quarter only; yet the impulse of the water is much greater, the height of the water being increased nearly the semi-diameter of the great wheel, all other things being equal. If the height of the water remain the same, the aperture of the penstock must be enlarged to nearly twice the area, that the force may be the same; so that to produce the same effect, twice as much water is necessary for the breast-mill as for an over-shot one, every thing else being the same.

Mr. Ferguson observes, that where there is but a small quantity of water, and a fall great enough for the wheel to lie under it, the bucket or over-shot wheel is always used. But where there is a large body of water, with a little fall, the breast or float-board wheel must take place. As to the under-shot mill, it is evident there can be only the impulse from the water; and therefore, the height of the water re-

maining the same, there must be a larger aperture of the penstock for the discharge of a greater quantity of water in the same time, in order to produce the same effect as the over-shot or breast-mill; whence a greater expence of water will be made here than in any other mill, and can only be supplied for a constancy by a river; and where this can be had, the under-shot is the easiest, cheapest, and most simple structure, of which a mill is capable. Dr. Defaguliers, having had occasion to examine many under-shot and over-shot mills, generally found that a well made over-shot mill ground as much corn, in the same time as an under-shot mill with ten times less water; supposing the fall of water at the over-shot to be twenty feet, and at the under-shot to be about six or seven feet: and he generally observed, that the wheel of the over-shot mill was of fifteen or sixteen feet diameter, with a head of water of four or five feet, to drive the water into the buckets with some momentum.

Mr. Ferguson has given the following directions how to construct water-mills, so as to be in the greatest degree of perfection; and also a table calculated from his rules, for the sake of those mill-wrights who either cannot calculate, or do not like to take the trouble.

When the float-boards of the water-wheel move with a third part of the velocity of the water that acts upon them, the water has the greatest power to turn the mill: and when the mill-stone makes about sixty revolutions in a minute, it is found to do its work the best. For, when it makes but about forty or fifty, it grinds too slowly, and when it makes more than seventy, it heats the meal too much, and cuts the bran so small, that a great part thereof mixes with the meal, and cannot be separated from it by sifting or boulting. Consequently, the utmost perfection of mill-work lies in making the train so, as that the mill-stone shall make about sixty turns in a minute when the water-wheel moves with a third part of the velocity of the water. To have it so, observe the following rules:

1. Measure the perpendicular height of the fall of water, in feet, above the middle of the aperture, where it is let out to act by impulse against the float-boards on the lowest side of the under-shot wheel.
2. Multiply this constant number 64.2882, by the height of the fall in feet, and extract the square root of the product, which shall be the velocity of the water at the bottom of the fall; or the number of feet the water moves *per* second.
3. Divide the velocity of the water by 3; and the quotient shall be the velocity of the floats of the wheel in feet *per* second.
4. Divide the circumference of the wheel, in feet, by the velocity of its floats; and the quotient shall be the number of seconds in one turn or revolution of the great water-wheel on whose axis the cog-wheel that turns the trundle is fixed.
5. Divide 60 by the number of seconds in a turn of the water-wheel or cog-wheel; and the quotient shall be the number of turns of either of these wheels in a minute.
6. By this number of turns divide 60 (the number of turns the mill-stone ought to have in a minute) and the quotient shall be the number of turns the mill-stone ought to have for one turn of the water or cog-wheel. Then,
7. As the required number of turns of the mill-stone in a minute is to the number of turns of the cog-wheel in a minute, so must the number of cogs in the wheel be to the number of staves in the trundle on the axis of the mill-stone, in the nearest whole number that can be found. By these rules the following table is calculated; in which the diameter of the water-wheel is supposed to be 18 feet, (and consequently

quently its circumference 56; feet,) and the diameter of the mill-stone to be five feet.

Perpendicular height of the fall of water in feet.	Velocity of the water in feet per second.	Velocity of the wheel in feet per second.	Number of turns of the wheel in a minute.	Required number of turns of the mill-stone for each turn of the wheel.	Nearest number of cogs and flaves for that purpose.	Number of turns of the mill-stone for one turn of the wheel by these cogs and flaves.	Number of turns of the mill-stone in a minute by these cogs and flaves.
1	8.02	2.67	2.63	21.20	127 6	21.17	59.91
2	11.40	3.72	4.00	15.00	105 7	15.00	60.00
3	13.84	4.61	4.91	12.22	98 8	12.25	60.14
4	16.01	5.35	5.67	10.34	95 9	10.56	59.87
5	17.93	5.96	6.34	9.46	85 9	9.44	59.44
6	19.64	6.53	6.91	8.61	78 9	8.66	60.10
7	21.21	7.07	7.50	8.00	72 9	8.00	60.00
8	22.65	7.56	8.02	7.48	67 9	7.44	59.67
9	24.05	8.02	8.51	7.05	70 10	7.00	59.37
10	25.43	8.45	8.97	6.60	67 10	6.70	60.09
11	26.59	8.86	9.40	6.38	61 10	6.40	60.16
12	27.77	9.26	9.82	6.11	61 10	6.10	59.90
13	28.91	9.64	10.23	5.87	59 10	5.90	60.18
14	30.00	10.00	10.60	5.66	56 10	5.60	59.36
15	31.05	10.35	10.99	5.46	55 10	5.40	60.48
16	32.07	10.69	11.34	5.24	53 10	5.30	60.10
17	33.06	11.02	11.70	5.13	51 10	5.10	59.67
18	34.02	11.34	12.02	4.90	50 10	5.00	60.10
19	34.95	11.65	12.37	4.85	49 10	4.80	60.61
20	35.86	11.92	12.68	4.73	47 10	4.70	59.59

Example.—Suppose an under-shot mill is to be built where the perpendicular height of the fall of water is nine feet: it is required to find how many cogs must be in the wheel, and how many flaves in the trundle, to make the mill-stone go about 60 times round in a minute, while the water-wheels float move with a third part of the velocity with which the water spouts against them from the aperture at the bottom of the fall.

Find 9 (the height of the fall) in the first column of the table; then against that number, in the sixth column, is 70, for the number of cogs in the wheel, and 10 for the number of flaves in the trundle: and by these numbers, we find in the eighth column that the mill-stone will make $59\frac{3}{5}$ turns in a minute, which is within half a turn of 60, and near enough for the purpose; as it is not absolutely requisite that there should be just 60 without any fraction: and throughout the whole table the number of turns is not quite one more or less than 60.

The diameter of the wheel being eighteen feet, and the fall of water nine feet, the second column shews the velocity of the water at the bottom of the fall, to be $24\frac{1}{5}$ feet per second; the third column the velocity of the float-boards of the wheel to be $8\frac{1}{5}$ feet per second; the fourth column shews that the wheel will make $8\frac{1}{5}$ turns in a minute; and the sixth column shews that for the mill-stone to make exactly 60 turns in a minute, it ought to make $7\frac{1}{5}$ (or seven turns and five hundred parts of a turn) for one turn of the wheel.

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Dr. Barker has invented a water mill, that has neither wheel nor trundle: this is represented in *fig. 1.* in which A is a pipe or channel that brings water to the upright tube B. The water runs down the tube, and thence into the horizontal trunk C, and runs out through holes at *d* and *e* near the ends of the trunk on the contrary sides thereof.

The upright spindle D is fixed in the bottom of the trunk, and screwed to it below by the nut *g*; and is fixed into the trunk by two cross-bars at *f*: so that if the tube B and trunk C be turned round, the spindle D will be turned also.

The top of the spindle goes square into the rynd of the upper mill-stone H, as in common mills; and as the trunk, tube, and spindle turn round, the mill-stone is turned round thereby. The lower, or quiescent mill-stone, is represented by I; and K is the floor on which it rests, and wherein is the hole L for letting the meal run through, and fall down into a trough which may be about M. The hoop or case that goes round the mill-stone rests on the floor K, and supports the hopper, in the common way. The lower end of the spindle turns in a hole in the bridge-tree G F, which supports the mill-stone, tube, spindle, and trunk. This tree is moveable on a pin at *b*, and its other end is supported by an iron rod N fixed into it, the top of the rod going through the fixed bracket O, and having a screw-nut *o* upon it, above the bracket. By turning this nut forward or backward, the mill-stone is raised or lowered at pleasure.

Whilst the tube B is kept full of water from the pipe A, and the water continues to run out from the ends of the trunk; the upper mill-stone H, together with the trunk, tube, and spindle, turns round. But if the holes in the trunk were stopp'd, no motion would ensue; even though the tube and trunk were full of water. For,

If there were no hole in the trunk, the pressure of the water would be equal against all parts of its sides within. But, when the water has free egress through the holes, its pressure there is entirely removed; and the pressure against the parts of the sides which are opposite to the holes, turns the machine. See Defaguliers's *Exp. Phil.* vol. ii. p. 417, &c. p. 431, &c. p. 459, &c. Fergufon's *Mechanics*, p. 45, &c. 4to. ed. and Supp. p. 10. See also on this subject, an elaborate paper of Mr. Smeaton, containing an account of a number of experiments, in order to estimate the natural powers of water and wind to turn mills, in the *Phil. Trans.* vol. li. art. 18 p. 100, &c.

The description of a mill, which we have given above in the words of the late ingenious Mr. Fergufon, is very correct. The improvements of late years, which have been made in mills for grinding corn, relate to the manner of their construction, and the proportions of the wheel-work, for giving motion to the mill-stones, by which the grinding is performed in the manner described. The late Mr. John Smeaton, F.R.S., was celebrated for his accuracy and judgment in the proportions of his mills, particularly those turned by water. We shall, under the article *WATER-WHEELS*, give some account of his principles; and under this head we shall describe a steam flour-mill, which was erected from his designs, at the victualling house for the navy at Deptford, in 1781. This was before the steam-engine of Mr. Watt was brought to the perfection it has since attained; and as the old atmospheric engine was thought to be unfit for producing a rotatory motion, Mr. Smeaton erected a common steam-engine to pump up water for the supply of a large overshot water-wheel, which actuated the mill. *Fig. 1.* of *Plate XXXIV. Mechanics*, represents the whole mill, by a longitudinal section of the house; and *fig. 2.*

another section, taken perpendicular to the former. The mill is double, that is, the water-wheel, A A, is situated between two buildings, only one of which is represented in *fig. 2*; and the wall, B B, of the other is one side of a house, containing exactly the same machinery as that which is delineated. Over the water-wheel two large cisterns, or troughs, C, D, are placed, communicating with each other by a large iron pipe E, *fig. 1*; and one of these troughs, C, has a pipe or trough, leading water into it, from the pump of the steam-engine supplying the water for the mill: in the other trough, D, is a shuttle *a*, which being raised up, permits the water to issue from a hole in the end of the trough, and fly forwards horizontally through a proper chute, or pentrough, into the buckets of the wheel A. The form of these buckets is shewn by *fig. 1*, a portion of the wheel being represented in section for that purpose. The buckets, which are thus filled at the top of the wheel, descend by their weight, turning the wheel round, till they come to the lowest part of the wheel; and here, by the buckets becoming inverted, the water is discharged from them, and they go up empty to the top of the wheel, where they are filled again from the trough. In this manner, one side of the wheel being always loaded by the buckets full of water, and the other side being empty, it has a constant tendency to turn round. The axis of the wheel has a large spur-wheel, E, fixed upon its extreme end, which being furnished with a double row of cogs, as shewn in *fig. 2*, communicates motion to the lanterns or trundles, F, G, one above, and the other below it: the latter, G, is fixed upon the end of an horizontal shaft H H, extending beneath the mill-stones, situated at I I and L: it actuates the upper stone of each pair, by means of crown or face-wheels K, which turn the pinions fixed at the lower ends of the respective spindle *dd*. The upper trundle, F, is fixed upon a shaft, which carries two face-wheels, *e, f*: the teeth of these wheels are opposite to each other, and either of them can be made to work a pinion, *g*, *fig. 1*, fixed upon the end of an axis *b*, which at the other end has a cog-wheel turning a pinion at *k*, on the end of the spindle of a machine, M, for dressing flour. This machine consists of a hollow cylinder or frame, covered with wire-cloth of different degrees of fineness; the finest being at the end A, which is the most elevated, for the axis of the cylinder is inclined in the direction of the dotted line: every one of the lengths, as it goes towards the other end, is covered with a coarser kind of wire-cloth, for sifting the flour. Within this cylinder, which is stationary, a reel is situated; its axis being exactly in the centre of the cylinder, and turned round by the pinion *k*: the rails of this reel are provided with hair brushes, which, as they revolve, brush against the interior wire surface of the cylinder. The machine is provided with a shoe or jigger, very similar to that of the mill-stones, to bring down the flour or meal through a trough, from the floor above, where it is kept after being ground: the meal, being by this means gradually fed into the cylinder, is, by the motion of the brushes on the reel, sifted or rubbed through the wire: the finest of the flour will of course go through at the upper end, but no other kind; the second through the next division, and so on till the bran falls out at the end of the cylinder, being too coarse to go through any of the wires. The cylinder is enclosed in a tight and close box M, to prevent waste by the flour flying about; and the box has partitions, which divide it into as many lengths as the cylinder has different kinds of wire. Thus each division of the box receives a different quality of flour; and spouts being fixed, which go down into the floor beneath, sacks can be filled at them without waste or inconvenience.

The pinion *g*, for turning the dressing machine, can be

made to turn either way about, by engaging it with the teeth of either of the cog-wheels *e, f*, which acting on the opposite sides of the pinion *g*, give the means of turning it in either direction at pleasure. The pinion is of such a diameter, that it cannot be engaged with both wheels at once; and the upright lever *r*, which supports the pivot of its axis *b*, can be thrown to either side, as is shewn in *fig. 2*: for its lower end moves on a centre at the floor, and at top it is guided by a groove in a piece of wood, fixed to the ceiling, and can be fastened at either side by a pin, so as to throw the pinion in gear with either *e* or *f*. The object of this contrivance is, that when the machine, M, has for a long time been running in one direction, and its brushes become worse, or bent on one side, its motion may be reversed, to give them an equal wear on the opposite side. The wheel, *e*, has another fixed to it at the back (see *fig. 2*), which actuates a cog-wheel N, upon the end of a roller R, having a rope wound round it, for drawing up sacks of corn or flour from one floor of the mill to another. This rope passes upwards from the roller to the roof of the building, where it passes over a pulley, and thence descends through square holes in the several floors to the ground. These holes are covered by double doors, opening upwards, so that a sack, being drawn up, opens the door, which falls down as soon as it has passed. The wheel, N, of the sack-roller can be disengaged at pleasure from the cog-wheel, *e*, which turns it; and then the rope can be unwound and run down again, to fetch up another sack. This disengagement of the wheel is effected by the same means as described of the upright lever *r*; and a line being conducted from the top of the lever, over proper pulleys, into various parts of the mill, the miller can, by pulling this line, disengage the roller at pleasure, to draw up or let down a sack. A pinion and shaft, similar to *g* and *b*, *fig. 1*, may be placed on the opposite side of the wheels, *e* and *f*, to work another dressing machine at the opposite side of the mill, or what is called a bolting machine. This is rather of a different construction, being the original flour-dressing machine: it consists of a reel like the former, but without any brushes; and upon this, instead of a wire-cylinder, a cloth like a sack, cut open at the bottom, is fastened, and revolves with it; the flour, being introduced by a feeding-shoe into this, is sifted round in the revolving cloth, and the fine flour passes through. To prevent the flour accumulating at any one side of the cloth into a bag, and swinging round with it, without sifting, four rails are fixed in the machine, parallel to the axis; and if the cloth swings out by the weight of the flour within it, the cloth strikes against these rails, and the flour is thus shaken through it into the chest or case of the machine.

The lower figures of the plate contain the development of the parts of the mill, tending to explain their construction. *Figs. 3, 4, and 5*, shew the cast-iron axis for the water-wheel; N is the cylindric shaft, and *b, b*, its two necks, which lay on bearings in the wall of the mill, and bear the weight: beyond these necks the axis has a square box, O O, at each end, for framing the great cog-wheels upon. The manner of attaching the arms of the great water-wheel to the shaft is this: two circular plates or saunches, P, P, *fig. 3*, are cast upon the axis; and against each of these 12 arms, Q, Q, are bolted: they are placed against the saunch, tending to the centre, and the spaces between them are filled up by wooden pieces, as shewn by *r, r, r*, *fig. 4*: two iron rings, R and S, are placed over the arms, and a bolt put through each arm, to attach it to the saunch, and to the axis; the wooden pieces, *r, r*, are kept in their places by a wedge driven through each, within the great hoop R, and by means of these wedges the pieces, *r, r*, can

at any time be drawn up towards the centre, to hold all the arms fast in their places.

This method of framing water-wheels was used with great success by Mr. Smeaton in many instances, and was found to answer the purpose extremely well, being a great improvement upon the old method of mortising the arms into a wooden shaft.

Fig. 6, 7, and 8, shew one of the spindles for the mill-stones H and L, *fig.* 2: it is a straight iron axis, *d*, formed to a pivot, *s*, at the lower end, which rests and turns in a piece of brass: near the upper end of the spindle another neck or pivot, *t*, is formed, and runs in a collar, in the centre of the nether or lower mill-stone, whilst the upper one is hung upon the arms of an iron cross T: see also *fig.* 7, fitted with a square upon the top of the spindle. On the lower part of the spindle the pinion Z, which gives it motion, is fixed: it has a square hole through it, fitting on the square spindle, and iron crosses are fixed both at top and bottom of the block of wood forming the body of the pinion: in this iron are two screws (see *fig.* 8.), which, being screwed fast, fix the pinion firmly to the spindle, its weight being supported by a wedge, *v*, put through a hole in it; but when this wedge is withdrawn, and the screws slackened, the pinion falls down so low upon the spindle, that its teeth are clear of the teeth of the cog-wheels *k*, *fig.* 2, and in this state the spindle and mill-stone upon it will stand still, though the mill is going. The spindle foot, *s*, rests in a brass socket, fixed in a lever *w*, *figs.* 1 and 2, called the bridge-tree: its fulcrum is in the solid wall, W, *fig.* 1, at one end, and the other rests on the middle of a second lever X, perpendicular to the former, called the brayer, one end of which has a fulcrum in the framing, *fig.* 2, and the other is supported by a screw, which the miller turns round, to elevate or depress the upper stone, and adjust the distance between them at pleasure, according as he wishes to grind finer or coarser flour. The upper part of the mill before us is used as a store-house for corn, which is drawn up in sacks by the tackle into the roof, and there emptied into bins, or different compartments, of the upper floor: from these it is let down to the mill-stones, and ground into meal. The spouts from the stones lead the meal into sacks, which, when full, are drawn up to the top of the house again, and emptied out into a flour bin, situated over the dressing machine M, which separates it into various qualities for use.

The mills which grind for the London market use three dressing machines: the finest flour is that which has been passed through a wire-cloth of 64 *per* inch, when the meal is dressed the first time; the other part of the cylinder is coarse wire, which suffers a coarse meal, called middlings, to pass through it; but the bran and coarse pollard fall out at the end of the cylinder. The middlings are ground over again in a pair of mill-stones, which are rather dull, and become unfit for grinding corn, without dressing them again: then, after this second grinding, the meal is dressed in the cloth machine, called the bolting cloth, which takes out the second flour, and the pollard comes out at the end of the cloth: the bran and the pollard together are now put into the clearing-off machine, which is a coarse wire-cylinder of the kind we have described, and by it is separated into hog pollard, which is the finest sort; 2d, horse pollard; and, 3d, bran. A pair of mill-stones will grind five bushels of wheat *per* hour, when in good condition; but require to be taken up and dressed once a week, if used constantly. This dressing is done by picking the surface of the stone over with the mill-pick, to cut the grooves and furrows sharp, that they may grind and cut the corn between them.

Persons riotously assembling and destroying, or maliciously burning, any wind-law mill, water-mill, or water-mill, &c. shall be guilty of felony, without benefit of clergy, by 9 Geo. III. c. 29. Prosecution to be commenced within eighteen months after the offence committed. By 41 Geo. III. c. 24. the damages occasioned by demolishing any wind-mill by persons riotously assembled, may be sued for and recovered in the manner provided for by 1 Geo. Stat. 2. c. 5. respecting the demolishing of churches and other buildings. (See Riot.) By 43 Geo. III. c. 58. any person who shall maliciously set fire to any mill in the possession of any other person, or of any body corporate, shall be guilty of felony, without benefit of clergy.

Water-mills have long been great nuisances to agriculture, by preventing the use of the streams on which they stand, in many cases, in irrigating and flooding the adjoining land, by which much improvement is kept back, that would otherwise take place. They are also injurious by obstructing and damming up the water in numerous instances, so as to render it stagnant on the ground above. Wind and steam may, however, be applied as the moving powers of mills without producing any such effects, and are, of course, the most proper powers to be employed.

The ancient feudal custom of obliging tenants to grind at the lord's mills, is now almost wholly done away. Draining or lifting-mills are often extremely useful in discharging water from low flat lands in many situations. The moving power in these is commonly wind. See MILL, in *Mechanics*.

By an ancient ordinance the toll for grinding shall be taken either to the 20th or 24th corn; and yet, in some places, millers claim and take the 16th part: but Mr. Dalton says, that the miller should take but one quart for grinding one bushel of hard corn, and if he carry back the grist to the owner he may take two quarts of such corn, *i. e.* wheat rye, and meslin, (wheat and rye mixed.) For malt he shall take half as much as for hard corn. By Holt ch. just. the toll of a mill must be regulated by custom, and if the miller take more than the custom warrants, it is extortion: but if it be a new mill, the miller is not restrained to any certain toll. (1 L. Raym. 149.) In some places the tenants are bound to have their corn ground at the lord's mill. When a miller, upon information given on oath to any magistrate, is suspected of adulterating meal or flour, the house, mill, &c. of such miller may be entered under the authority of a warrant of a magistrate, at all reasonable times of the day, to search for discovery, and if such adulterated meal or flour be found, it may be seized by the officer executing the warrant, seized by the magistrate to whom it is carried, and disposed of at his discretion. (31 Geo. III. c. 29.) A miller who hath corn given him to grind, and who charges for that which is bad, is indictable; and he may be guilty of felony by taking away any part with an intent to steal it. (Hawk. c. 33.) Millers are not to be common buyers of any corn, with a view to sell the same again, either in corn or meal. (Dalt. c. 122.) By 36 Geo. III. c. 85, every miller shall keep balances and weights according to the standard of the exchequer, which may be examined by a person appointed for this purpose by 35 Geo. III. c. 102; and in default thereof the miller shall forfeit not exceeding 20s. &c. &c. Millers may be required to weigh corn, and, on refusal, shall forfeit not exceeding 40s. Millers are to deliver the whole produce of corn when ground, if required, allowing for waste in grinding and dressing, and for toll when taken; and if such

corn shall weigh less than the full weight, such miller shall, for every bushel of corn deficient in weight, forfeit not exceeding 1s. and also treble the value of such deficiency. When toll is taken, it shall be deducted before the corn shall be put into the mill. No miller shall demand corn for toll, but in lieu thereof shall be entitled to payment in money, under penalty of forfeiting not exceeding 5l.: excepting when persons shall not have money to pay for grinding, and also, that this shall not extend to mills called "Soke-mills," or such ancient mills as are established by custom and the law of the land, which mills shall continue to take toll as they have been accustomed to do. Every miller is required to put up in his mill a table of the prices in money, or of the amount of toll or multure, on pain of forfeiting 20s. for every such offence.

MILLS, *Wind*, are, with respect to their working parts, little different from those of water-mills; but they are turned by the force of wind gathered in their sails.

Of these, some are called *vertical*, others *horizontal*, according to the position of the sails; or, rather, according to the direction of their motion, with regard to the horizon.

For the best form of horizontal sails, and also for determining the position of the axis of wind-mills, see WIND-mill and MECHANICS.

MILLS, *Portative* or *Hand*, are those kept in motion by the hand; or else whose mill-stones are turned, or pistons driven by the force of horses or other beasts. Thus, if the cog-wheel D, (*Plate XXXIII. Mechanics, fig. 1.*) be made about eighteen inches diameter, with thirty cogs, the trundle as small in proportion, with ten staves, and the mill-stones be each about two feet in diameter, and the whole work be put into a strong frame of wood, as represented in the figure, the engine will be a hand-mill for grinding corn or malt in private families. And then it may be turned by a winch instead of the wheel A A; the mill-stone making three revolutions for every one of the winch. If a heavy fly be put upon the axle B, near the winch, it will assist greatly in regulating the motion.

If the cog-wheel that turns the trundle or trundles of a mill be placed horizontally, horizontal levers may be fixed into its vertical axis, and horses applied to these for turning the mill; which is often done where water cannot be had for that purpose.

The use of mills and mill-stones, according to Pausanias, was first invented by Myla, son of Meleges, first king of Sparta; though Pliny attributes the invention of every thing belonging to bread and baking, to Ceres: Polydore Virgil was not able to discover the author of so useful a machine. It is doubted whether or not water-mills were known to the Romans, there being no mention made, in the Digest, but of mills turned by slaves and asses. Salmasius, however, and Gothofred, will not allow water-mills to have been unknown to the ancient Romans, though they were not in ordinary use. Wind-mills are of much more modern invention; the first model of these was brought from Asia into Europe in the time of the holy wars.

MILL is also used for any machine, which being moved by some external force, serves to give a violent impression on things applied to it.

Mills, in this sense, are machines of vast use in the manufactures, arts, and trades; for the making and preparing divers kinds of merchandizes. The principal are those which follow.

MILL, *Colour*. Colours for the use of painters, paper-

stainers, &c. are prepared, in the large way, by grinding them, either with oil or water, in mills worked formerly by horses, but now frequently steam-engines are used for such purpose in London. These colour-mills consist of a large toothed-wheel, or cog-wheel, worked by the horses, or steam-engine, &c. which gives motion to several trundles and upright spindles of small mill-stones placed round its circumference. The construction and use of these will be readily comprehended from the following description of a single pair of stones to be worked by hand, *Plate XXXV. fig. 1.* The winch-handle A gives motion, by the labour of a man, to the spindle B and fly-wheel C, fixed thereon; and which also carries a small spur-wheel D, having eighteen bevelled teeth, which work into those of the crown-wheel E E, of twenty-six teeth, fixed upon the upright spindle F, working in a brass collar at top, fixed to the piece of wood G, which is adjustable by means of the wedge H, so as to keep the teeth of the wheels properly in gear: the bottom of the spindle works in the end of a brass screw R, working in the bottom framing of the machine, and passing up through the centre of the lower stone, the turning of which screw, occasionally, adjusts the distance of the stones, which are of the common construction, exactly like those for grinding flour, but smaller, each being sixteen inches diameter and three inches thick. The upper stone I is supported on the upright spindle F by a shoulder and crow, the same as mill-stones in general; it has a hopper K affixed to it, and which revolves with it, into which the semi-fluid colours intended to be ground are put, and when ground they are protruded through a spout from the tub M, nineteen inches diameter, which contains the stones.

After the above process, colours for the use of painters, &c. were ground by hand with oil or water, on a polished marble slab with a pebble muller; but this process being tedious and expensive, as well as highly prejudicial to the health of the workman, Mr. James Rawlinson of Derby, some years ago contrived a mill for this purpose, which is represented in *fig. 2*, a model of which he presented to the Society of Arts in the Adelphi, London, in 1804. A is a roller or cylinder of black marble, truly formed and well polished, 16½ inches diameter and 4½ inches broad; B is a concave muller, covering one-third of the roller, of the same kind of marble, well polished, and fixed in the wooden case or frame b, which is hung on hinges at i, for use when the muller requires to be lifted off the cylinder. C is a crooked bar of iron, about an inch broad, moveable on a pin at f, in order to turn down out of the way when the muller is to be lifted off: near the end of this bar is a thumb-screw c, whose end acts in a hole in the wooden case b, and serves to keep that and the muller steady, and to increase the pressure of the muller as occasion may require. D is a scraper or taker-off, made of a piece of clock-spring fixed in an iron frame K, in the manner of a frame-saw, and turning on centres d d, so that when in use the taker-off lies in an inclined position against the cylinder, and at other times is turned back out of the way. H is a plate set under the taker-off to catch the colour when sufficiently ground, which stands upon a sliding board that can occasionally be drawn out, to remove any colour which may accidentally drop from the cylinder. F is a drawer under the mill for holding carriers' shavings, for cleaning the cylinder and muller, when a fresh colour is wanted to be ground. The colour, roughly ground in a large colour-mill above described, is applied in proper quantities, by means of a knife, to the front of the cylinder above the taker-off, and by means of the winch-handle G the mill is worked, until the colour, by passing between the revolving stone

stone and muller, is sufficiently ground; when the taker-off D, which during the operation lay back, is turned against the stone, the winch-handle is turned the reverse way for a few revolutions, in order to scrape off the colour which falls into the dish H.

In the Philosophical Transactions, No. 87, a mill is described as having been used by Dr. Langelot, for grinding leaf gold to powder, for the fanciful purpose of preparing *Aurum potabile*: the principles of this mill were, some years ago, found applicable to the grinding of dry indigo in Mr. Taylor's manufactory at Manchester, and were also found by Mr. Rawlinson, above mentioned, to be the best adapted for finely pulverizing the dry colours intended to be ground with oil or water in his colour-mill. This simple mill is represented in *fig. 3*, where L is a marble mortar, nicely formed and polished; M is a muller nearly in the form of a pear, having an iron axis fixed into its upper end, which is bent into the form of a crank at P to serve as a handle for turning the muller: the axis is fixed, when in use, into two collars O, O, in beams of wood N N, so as to revolve easily and truly in the axis of the mortar. This muller is shewn separately at *fig. 4*, which shews a slit that is made through it, almost dividing it into two parts: this slit is of use in collecting the colour which is grinding, and bringing it continually under the muller. A circular board in two halves, with a centre-hole to fit the axis, is used to lay over the mortar, to prevent the dust of the colours from flying out, to waste the same and injure the health of the workmen. By means of the flat perforated weights R, on the top of the axis, any required pressure can be applied upon the muller.

For preserving the health of such colour-men and painters as still prefer the common stone and muller for grinding their colours, M. Boulard, in the Journal de Physique, recommends an apparatus represented in *fig. 5*, wherein the stone, and its table A B, is surrounded by a close-sided casing of boards C, C, fitted to the floor of the room, and leaving a space of about $\frac{1}{2}$ th of an inch wide all round the table supporting the stone; this is for emitting a current of fresh air, which is to be supplied by a pipe D D extending from a hole in the floor under the case, to the outward air in some most convenient place. Over the stone a glazed pyramid E E and metal tube F is supported by the irons G and braces H, H, H, or by other more convenient means, so that the pyramid E E projects, on all sides, about three inches beyond the stone; and at a height above the same no greater than is sufficient for the free admission of the workman's arms to work the muller, and with his pallet knife to scrape together the colour when requisite, and which he will be able perfectly to see to do, through the glass in the frame, without inhaling the vapour from the colours, but which are to be made to ascend through the tube F, and pass off into the open air through the tube M M, by means of a small stove I I closely jointed to the tubes F and G, which is to be kept burning during the hours of work, in order to produce a current between the pipes D and M, that may effectually carry off the contaminated air which has been in contact with the colours on the stone, along with their effluvia. K represents the door of the fire-place, and L that of the ash-hole of the stove, both contrived to shut very close. In the pipe F a register N should be made for regulating the turning of the stove, by the admission of more or less air hereto through the pipe F. If desirable, the close pipe F may be conducted into the fire-place of any stove or fire in the apartments above, or it may even descend by a proper curvature, so as to admit of the stove I I being placed on the ground, and applied to any useful purpose, as the boiling of oil, or heating an adjoining room, &c.

MILL, Cotton. See MANUFACTURE of Cotton.

MILL, Flood, that sort of mill which is contrived for the purpose of raising water in order to discharge it from fens, marshes, and other similar kinds of land.

MILLS, Forge, turned by water, serve to raise and let fall one or more huge hammers, to beat and form the iron into bars, anchors, and other massive works. They are also called tilt-mills. See FORGE, IRON, and STEEL.

MILL, Fulling, is a water-mill which raises and beats down large wooden pistons in proper vessels called *poils*, or *troughs*; in order to full, scour, and cleanse woollen stulfa. See FULLING-Mill.

MILL, Gunpowder, is that used to pound and beat together the ingredients whereof gunpowder is composed.

This is done in a kind of iron or brass mortar, by means of iron pestles wrought by a wheel, without-side the mill, turned by the water falling on it. See GUNPOWDER.

MILLS, Leather, are used to scour and prepare with oil, the skins of stags, buffaloes, cows, bullocks, &c. to make what they call *buff-leather*, for the use of the soldiery.

This is effected by means of several large pistons, rising and falling on the skins, in large wooden troughs, by means of a wheel without-side, turned by the force of water.

MILLS, Linen, do not differ much from fulling-mills. Their use is, to scour linens, after their having been first cleansed when taken out of the lixivium, or ley. Some of these go by water, and the generality by horses.

MILLS, Oil, when turned by men, water, hand, or horse, serve to bruise or break the nuts, olives, and other fruits and grains, whose juice is to be drawn, by expression, to make oil. See OIL.

MILL, Paper, a water-mill, furnished with engines containing cylinders furnished with teeth which cut and grind the rags or cloth in a kind of wooden trough; and thus, by reducing them to little pieces, turn them into a kind of pulp, by means of water conveyed into the troughs by a pipe for that purpose. See PAPER.

MILL, Sawing, is a water-mill, serving to saw several planks or boards at the same time.

These are frequent in France, especially in Dauphiné.

They were lately prohibited in England, where they were begun to be introduced, from a view to the ruin of the sawyers, which must have ensued. See SAWING, also MACHINERY, Block.

There are also *silk* mills, for spinning, throwing, and twisting silks; which are large round machines in form of turrets, five or six feet high, and six yards in diameter; which, being turned, either by the force of water or that of men, work at the same time an infinity of bobbins fastened thereto, whereon the silk had been wound to be here spun and twisted.

There are abundance of mills of this kind in France, especially about Lyons and Tours, some of which are so disposed, as that three of them will go at the same time, and by the same wheel wrought by water or by strength of hand. That in the Hôpital de la Charité at Lyons, is wonderful, a single man working no less than 48 of these mills. See SILK, and WINDING of Silk.

MILL, Stamping. See STAMPING.

MILL, Sugar, is a machine that serves to bruise the sugar-canes, and express the liquor or juice contained therein. The sugar-mills are very curious contrivances. Of these there are four kinds, being turned either by water, wind, men, or horses.

Those turned by the hand were first in use; but they are now laid aside, as being an intolerable hardship on the peo-

negroes who were doomed thereto, besides the slowness of their progress.

Wind-mills are the most modern: but they are yet somewhat rare, excepting in St. Christopher's and Barbadoes, and among the Portuguese. These make good dispatch, but have this inconvenience, that they are not easily stopped; which proves frequently fatal to the negroes who feed them. See SUGAR.

MILLS, *Tan or Bark*, wrought by water or horses, serve to cut certain barks into a coarser sort of powder, proper for the tanning of hides, &c.

MILLS for *Sword-blades* are likewise moved by water. They are frequent at Vienne, in Dauphiné. By working heavy hammers they forge those excellent sword-blades, called *blades of Vienne*.

The uses and operations of these several mills, more at large, see under PAPER, FULLING, SUGARS, &c.

MILL, *Threshing*, such a machine as is contrived for the purpose of threshing grain or other sorts of seed crops. See THRESHING Machine.

MILL, in *Coinage*, is a machine used to prepare the laminæ, or plates of metal, and to give them proper thickness, hardness, and consistence, before they be struck, or stamped.

This machine has not been long known among us; but is of some standing in Germany. It consists of several wheels dented like those of clocks, &c. which move two cylinders of steel, between which the metal is passed to be brought to its proper thickness. It was first turned with water, since with horses. See COINAGE.

MILL, in *Commerce*, a money of account in the United States of America; 1000 mills being = 100 cents = 10 deniers = a dollar.

MILL, among *Gold Wire Drawers*, is a little machine consisting of two cylinders of steel, serving to flatten the gold or silver wire, and reduce it into laminæ, or plates. See GOLD Wire.

They have also mills to wind the gold wire or thread on the silk: these are composed of several rows of bobbins all turned at the same time.

MILL-*Reek*, in *Medicine*, an appellation given by the miners, employed at the Leadhills in Scotland, to those affections of the bowels, and of the nervous system, which are occasioned by the poison of the lead. The melting-houses, in which the operations are carried on, are called *mills*, because the bellows there are worked by water-wheels; and the *reek*, or smoke, arising from the melted lead, is believed to be the chief cause of the disease: whence the term *mill-reek* has been appropriated to the malady. See *Essays and Obs. Phys. and Liter.* vol. i. art. xxii. Edinburgh.

MILL-*Dams*, in *Rural Economy*, the basons which contain the water for supplying mills. A very firm way of making these in a quick or running sand; which is usually found a very troublesome circumstance in the making of them, is by laying the foundation with unslaked lime; which, by slaking among the sand, runs together into a hard stone, which gives a very firm and sure foundation. Plott's Staffordshire, p. 336.

MILL-*Holms*, a term applied to the low meadows, and other fields in the vicinity of mills, or watery places about mill-dams. The soils in these cases are generally of a good quality.

MILL-*Pool*, a stock or pond of water, by the force of which the motion of a water-mill is effected.

The dam of a mill-pool is raised much in the same manner as directed for *fish-ponds*; which see.

MILL-*Stones*, in *Rural Economy*, the prepared stones made use of in grinding grain and other substances, which are of

different kinds, according to the purposes for which they are employed, but those chiefly used in grinding wheat into flour, were formerly imported from France, and termed *burrs*. Lately, however, stones proper for this use have been discovered in different parts of this kingdom, as in Wales and Scotland. In the first of these places they were found by Mr. Bowes, in a quarry which is "situated within the corporation liberties of Conway: the stone appears within a quarter of a mile of that town, and extends from east to west for the distance of two miles, appearing in most places upon the surface within that distance. Such an immense body of the stone has been left bare and exposed to view, that the industry of ages would scarcely lessen it. A deep chasm intervenes at the end of two miles; and, on examining the same line across this valley, he found the stone mixed up with various other fossil substances, to which it seems to bear no relation. In the next rise of mountains it resumes its quality, and takes a southerly direction, passing through a range of hills to the distance of two miles more, where the vein disappears. It is every where the highest stratum; and when disengaged from the quarry where now worked, it tumbles down the side of the mountain to the plain within five hundred yards of the shipping-place, where small vessels may lie safely in all weathers at a natural quay, completely calculated for this business." The quarry lies on the decline of a hill: the vein now is about eight yards wide; but he has reason to suppose it wider below. At the depth he has sunk, which is at least twenty-five feet, the stone mends in quality. When first taken from the quarry it is much softer and easier wrought into shape, than when exposed to the air: even a day makes a difference. The vein appears to him quite inexhaustible, and contains every variety of the stone, cellular, close, hard, or soft. The right in this tract of country has been presented to him, by Mr. Sneyd of Staffordshire, under the hope that he might be able to make this discovery, and carry it vigorously into effect, in which he has not been disappointed.

It would appear from the evidence sent to the Society for the Encouragement of Arts, &c. that the stones raised from this quarry are capable of being employed in most cases where those imported from France have been in use, and that the stone, from its external appearance, seems to be constituted of quartz and cherts.

And in the latter of the above situations stones fit for this use were discovered by James Brownhill, miller, "who, when the late unfortunate war had rendered the getting of the French burr extremely difficult, as he was passing by the great basaltic rock of the Abbey Craig, near Stirling, examined the texture of several masses of the stones; and found one species, which appeared to him fit for the grinding of wheat, and brought home a sample of them, which he shewed to Mr. Alexander Ball, agent of the Alloa Mills, who agreed to make trial of a pair. They were built under his direction in the same manner as the French burr; and, on their being put to work, gave such satisfaction to the customers of the mills, as induced the Alloa Mill company to have another pair built, and totally lay aside the French burr mill-stones." It is suggested, that "the French burr stones are so porous, as to make it necessary to fill up the cavities with a preparation of alum: this considerable expence is saved by the uniform texture of the basaltes; and their superior excellence is so apparent, that upwards of 60 pair are now at work in several parts of the kingdom, and the demand for them is daily increasing." In addition it is stated, that "the basaltes mill-stones are not only excellent for manufacturing of flour, but for all kind of grist. The distillers give them a decided preference, and they grind oats

in a very complete style, as the meal is returned quite free of sand, which is a great desideratum for those places where oat bread is in use. The discoverer of this use of the basaltæ, builds mill-stones of all sizes on moderate terms, and is careful, from his experience as a miller, to build them of such a grain as is most suitable for the particular purposes for which they are intended.

The following remarks are offered by Mr. Ferguson on the size and velocity of mill-stones. The diameter of the upper stone is generally about six feet, the lower stone about an inch more; and the upper stone, when new, contains about 22½ cubic feet, which weighs somewhat more than 19,000 pounds. A stone of this diameter ought never to go more than 60 times round in a minute; for if it turns faster, it will heat the meal. But according to Mr. Ingham, the mill-stone should turn twice round in a second of time, and should only be four feet and a half in diameter. It may probably be imagined, that the meal will be much heated by such a rapid motion as he has recommended, but the effect is counteracted by diminishing the size of the mill-stone from six feet to four and a half. The velocity of the circumference of the small mill-stone moving twice round in a second, is only one-third greater than the velocity of the large mill-stone moving once round in a second.

It may be noticed, that in the former of the above quarries mill-stones are raised which are of much larger sizes than the French burrs, which may probably be an advantage in some cases.

The modes of preparing mill-stones for the purpose of grinding have been described already, and *fig. 6. of Plate XXXV.* represents the surface of the under grinding mill-stone, the way of laying out the wads or channels: the wooden bush is fixed into the hole in the middle, in which the upper end of the iron spindle turns round; and the case or hoops that surround the upper one, which ought to be two inches clear of the stone all round its circumference. B shews the upper grinding mill-stone, and iron cross or rynd in its middle, in the centre of which is a square hole that takes in a square on the top of the iron spindle, to carry the mill-stone round; when the working sides or faces of the mill-stones are laid uppermost, the wads must lie in the same direction in both, that when the upper stone is turned over, and its surface laid on the under one, then the channels cross each other, which assists in grinding and throwing out the flour; the wads are also laid out according to the way that the upper stone revolves. In these the running mill-stone is supposed to turn *sunways*, or what is called a right-handed mill; but if the stone revolves the other way, the channels must be cut the reverse of this, and then it is termed a left-handed mill. See **MILL**.

The mill-stones which we find preserved from ancient times, are all small, and very different from those in use at present. Thoresby mentions two or three such found in England, among other Roman antiquities, which were but twenty inches broad; and there is great reason to believe that the Romans, as well as the Egyptians of old, and the ancient Jews, did not employ horses, or wind, or water, as we do, to turn their mills, but made their slaves and captives of war do this laborious work; they were in this service placed behind these mill-stones, and pushed them on with all their force.—Sampson, when a prisoner to the Philistines, was treated no better, but was condemned to the mill-stone, in his prison. The runner, or loose mill-stone, in this sort of grinding, was usually very heavy for its size, being as thick as broad. This is the mill-stone which it is expressly prohibited in Scripture to take in pledge, as lying loose it was more easily removed. The Talmudists have a story,

that the Chaldeans made the young men of the captivity carry mill-stones with them to Babylon, where there seems to have been a scarcity at that time; and hence, probably, their paraphrase renders the text "have borne the mill, or mill-stones;" which might thus be true in a literal sense. They have also a proverbial expression of a man with a mill-stone about his neck; which they use to express a man under the severest weight of affliction. This also plainly refers to this small sort of stone.

MILL-Work. Under this head we intend to treat of the parts and mechanical contrivances used in mills. Under the article **MACHINERY**, the reader will find observations of a similar nature to those of the present article, but applied to smaller and more delicate machines than those which are usually denominated mills.

The object of this article will therefore be, to give a general account of the most important pieces of mill-work, as cog-wheels, shafts, bearings, &c.; which parts being common to mills of all kinds, would, if minutely described under every head where they are employed, introduce a great many needless repetitions.

The different first movers of mills will be treated of, and described under their several heads of **STEAM-Engine**, **WATER-Wheels**, and **WIND-Mill**; and the acting machines of several kinds of mills, as clay-mill, grinding-mill, under **CUTLERY**; fulling-mill, flour-mill, iron-mill, under **MANUFACTURE of Iron**; oil-mill, cotton-mill, under **MANUFACTURE of Cotton**; rolling-mill, spinning-mill, silk-mill, thrashing-mill, water-mill, sawing-mill, under **MACHINERY for manufacturing Ships' Blocks at Portsmouth**; **TILT Mill**, &c. &c.

Cog-wheels are the most important and numerous parts of mill-work, few mills being without them, to modify the direction, and adapt the power of the first mover, which actuates the mill, to the working point, or the machine which performs the operations the mill is intended for. Most mills contain several different kinds of machines, or operative parts, all deriving their motions from the same source, or first mover. Thus, a flour-mill contains stones for grinding; dressing machines for sifting the flour; sack tackle, for drawing up the sacks, &c.; all which are moved by the same first mover as a water-wheel, wind-mill, steam-engine, or horse-wheel. But each of these machines requires to be moved with a different velocity to perform its work in the best manner; and it is the object of the mill-work to obtain these different velocities from the same first mover, chiefly by the means of wheels; which, therefore, from their importance, deserve the first notice. There are a variety of cog-wheels, as spur-wheels, (or *gear* in the technical phrase,) bevil-wheels, face-wheels or crown-wheels, pinions or nuts, trundles or lanterns; with a variety of other names which are local, but have the same signification with some of the above.

Spur-wheels are those in which the teeth project from the periphery of the wheel, in the direction of radials (see *Plate 1. fig. 1. of Mill work*): they are so called, from the resemblance to the rowel of a spur. A spur-wheel is used to communicate motion by its teeth to another, situated in the same plane; consequently, the axes of the two are parallel to each other. The spur-wheel, at other times, works with a pinion, or nut (see *fig. 2.*), which is in fact a spur-wheel of small size: at other times with a *trundle* or *lantern*. This is a pinion of peculiar construction, consisting of two circular boards A, A, (*fig. 3.*) fixed, at some distance apart, upon its axis of motion or shaft B B, and united by a number of cylindrical pins *a, a*, called *staves*, or *rounds*, which are arranged in a circle, and fixed parallel to the axis of the trundle between the two boards of it. The teeth of the wheel

act upon these rounds to give motion to the trundle; the rounds, therefore, must be the same pitch or distance asunder as the cogs of the wheel. The number of the rounds of the trundle of course determine its diameter. Trundles have of late years fallen into disuse among mill-wrights, cast iron pinions being found much more preferable: they were sometimes used to work with spur-wheels, but more commonly with

Face-wheels, see *fig. 4*. In these, the teeth or cogs are fixed perpendicularly to the plane of the wheel, parallel, therefore, to its axis: they were used to work with another similar wheel, or with a trundle with a spur-wheel, or with a pinion, when the two axes were required to be perpendicular to each other, as shewn in *figs. 3* and *4*.

The crown or face-wheel has of late years been almost wholly superseded by bevil-wheels, which, in all situations where a wheel is required to turn another in a direction perpendicular or inclined to itself, are found vastly superior.

Bevilled or Mitre-wheels, see *fig. 5* of the plate, have their teeth formed upon a conical surface, the angle of the cone being the same as the angle the axes C, D, of the two wheels A, B, make with each other. The introduction of this class of wheels into machinery is a very essential improvement, which has been wholly made within these thirty years. Bevil-wheels are of course always used to work with others of the same kind.

The manner of setting out the teeth of cog-wheels, in such a form that they shall act in the most equable manner upon each other, and with the least friction, has been a subject of much investigation among mathematicians and theoretic mechanics; but the practice and observation of the mill-wrights have produced a method of forming cog-wheels, which answers nearly, if not fully as well in practice, as the geometrical curves which theory has pointed out to be the most proper. This they have effected by making the teeth of the modern wheels extremely small and numerous. In this case, the time of action in each pair of teeth is so small, that the form of them becomes comparatively of slight importance; and the practical method of the mill-wrights (using arcs of circles for the curves) approximates so nearly to the truth, that the difference is of no consequence: and this method is the best, because it so easily gives the means of forming all the cogs exactly alike, and precisely the same distance asunder, which, by the application of any other curve than the circle, is not so easy. The method, which is extremely simple, is explained by *fig. 1*. The wheel being made, and the cogs fixed in much larger than they are intended to be, a circle, *aa*, is described round the face of the rough cogs upon its *pitch diameter*, that is, the geometrical diameter, or acting line of the cogs; so that when the two wheels are at work together, the pitch circles, *aa*, of the two are in contact. Another circle, *bb*, is described within the pitch circle for the bottom of the teeth, and a third, *dd*, without it, for the extremities. After these preparations, the pitch circle is accurately divided into the number which the wheel is intended to have: a pair of compasses are then opened out to the extent of one and a quarter of these divisions, and with this radius arcs are struck on each side of every division, from the pitch line *a* to the outward circle *dd*. Thus, the point of the compasses being set in the division *e*, the curve *fg* on one side of the cog, and *no* on one side of the other, are described; then the point of the compasses being set on the adjacent division *k*, the curve *lm* is described. This completes the curved portion of the cogs *e*, and this being done all round completes every tooth: the bounding portion of the cog within the pitch circle, *a*, is bounded by two straight lines drawn from the points *g* and *m* towards the centre;

this being done to the cogs all round, the wheel is set out, and the cogs, being dressed or cut down to the lines, will be formed ready for work, every cog being of the same breadth; and the space between every one and its neighbour is exactly equal to the breadth, provided the compasses are opened to the extent of one division and a quarter, as first described.

Many different methods of forming teeth have been proposed, among them the following: Let the tooth *a* (*fig. 6*) press on the tooth *b* in the point C; and draw the line F C D E perpendicular to the touching surfaces in the point C: draw A F, B E, perpendicular to F E, and let F E cut the line A B in D. It is plain from the common principles of mechanics, that if the line F E, drawn in the manner now described, always pass through the same point D, whatever may be the situation of the acting teeth, the mutual action of the wheels will always be the same. It will be the same as if the arm A D acted on the arm B D. In the treatises on the constructions of mills, and other works of this kind, are many instructions for the formation of the teeth of wheels; and almost every noted mill-wright has his own nostrums. Most of them are egregiously faulty in respect to mechanical principle. Indeed, they are little else than instructions how to make teeth clear each other without sticking. Dr. Hooke was, we think, the first who investigated the form of teeth which procured this constant action between the wheels; and in a very ingenious dissertation, published among the Memoirs of the Academy of Sciences at Paris, 1668, this gentleman shews that this will be ensured by forming the teeth into epicycloids. Mr. Camus, of the same academy, has published an elaborate dissertation on the same subject, in which he prosecutes the principles of M. De la Hire, and applies it to all the varieties of cases which can occur in practice. There is no doubt as to the goodness of the principle, and it has another excellent property, "that the mutual action of the teeth is absolutely without any friction." The one tooth only applies itself to the other, and rolls on it, but does not slide or rub in the slightest degree. This makes them last long, or rather does not allow them to wear in the least. But the construction is subject to a limitation which must not be neglected. The teeth must be so made, that the curved part of the tooth *b*, is acted on by a flat part of the tooth *a*, till it comes to the line A B in the course of its action; after which the curved part of *a* acts on a flat part of *b*, or the whole action of *a* on *b* is either completed, or only begins at the line A B, joining the centres of the wheels.

Another form of the teeth secures the perfect uniformity of action without this limitation, which requires very nice execution. Let the teeth of each wheel be formed by evolving its circumference; that is, let the acting face G C H of the tooth *a* have the form of a curve traced by the extremity of the thread F C, unrolled from the circumference. In like manner, let the acting face of the tooth *b* be formed by unrolling a thread from its circumference. It is evident that the line F C E, which is drawn perpendicularly to the touching surfaces in the point C, is just the direction or position of the evolving threads by which the two acting faces are formed. This line must, therefore, be the common tangent to the two circles or circumferences of the wheels, and will, therefore, always cut the line A B in the same point D. This form allows the teeth to act on each other through the whole extent of the line F C E, and, therefore, will admit of several teeth to be acting at the same time; (twice the number that can be admitted in Mr. De la Hire's method.) This, by dividing the pressure among several teeth, diminishes its quantity on any one of them, and, therefore diminishes the dents or impressions which they unavoidably make

make on each other. It is not altogether free from sliding or friction, but the whole of it can hardly be said to be sensible. The whole side of a tooth three inches long, belonging to a wheel of ten feet diameter, acting on the tooth of a wheel of two feet diameter, does not amount to $\frac{1}{16}$ th of an inch, a quantity altogether insignificant. Conical wheels, or bevelled gear, may be considered as consisting of two cones rolling on the surfaces of each other: let B and C, (*fig. 7.*) be the bases of two cones turning on their centres, having teeth cut on them diverging from the apex A to the bases B and C. These teeth will work freely into one another from the apex A to the bases B and C, when turned round; but the teeth near the point of the cone being small and of little use, may be cut off at G and H. These teeth may be made of any breadth, according to the stress they are intended to bear; and this is of vast importance, because by this method they may be made to overcome a much greater resistance, and work smoother than a face-wheel and trundle of the common form. Besides, these kind of wheels are of singular use to communicate motion in any direction, or to any part of a building, with less trouble and friction than wheels of any other construction.

We shall now venture some remarks upon the manner of constructing wheel-work. Cog-wheels were formerly made of wood, and some are still constructed of that material; but of late years cast-iron wheels have been substituted, and found much superior in strength, accuracy, and durability. Wooden wheels are framed together in segments usually of three thicknesses, to break the joints upon each other. (See *fig. 1.*) The middle thickness is made in six or eight pieces, and left on the inside with straight sides, *x, x*, into which the arms are fitted, and bolted against it. On each side this middle thickness, another is (*XX, fig. 1.*) placed with break joints, and all the three are bolted together to make a solid rim, in which the cogs are to be fixed by mortises, the tenons or tails of the cog being held in their places by a pin driven through each. The arms of wooden wheels are made in different ways; sometimes they are mortised through the shaft, and the ends are notched in the middle of the sides of the octagonal pieces *x, x*, and laying against the face of them behind, are bolted to them to make all fast. This manner of uniting the arms with the rim is shewn at *l* (*fig. 4.*); but this method is not the best, because the mortises weaken the shaft very materially, and it is difficult to get such a wheel off if ever it is required, on a failure of the shaft, &c. On this account, the method called clasp arms is much preferable: it is shewn in *fig. 1.* Four arms *E E, F F*, are used, which are halved into each other, and form a frame as in the figure, leaving a square opening in the centre, and holding the rim of the wheel by their ends, which are bolted to the middle thickness of the rim, as shewn in *fig. 4.* To fit on such a wheel as this, the shaft is made up to a square, by fixing pieces of wood upon its sides; and the wheel being hung upon this, is made fast by wooden wedges driven in all round, the square formed between the arms being rather larger than the shaft, by which means the wheel can be adjusted to come quite true by the wedging. Face-wheels, like *fig. 4.* have sometimes stays or braces proceeding from the back of the rim to some distance along the shaft, where they are received in mortises, as shewn by the dotted lines: these make the wheel exceedingly strong, and keep it very stiff in the square upon its axis, which is very necessary, as the action of the teeth of a face-wheel meeting a trundle, is to throw the wheel back upon its shaft, which tendency these stays effectually counteract. At other times, two sets of clasp arms are used for the same end, one bolted on each side of the middle thick-

ness of the wheel, by the same bolts which pass through both, as well as the wheel, and unite the two sets like one, but of considerable depth, so that the wedging will have a greater effect to keep the wheel in the square. Small wheels are frequently made of plank, solid, without any arms. In this case the middle thickness is made of four pieces, leaving a square hole between them, and they are kept together by a circular ring of segments, bolted on at each side all round, and the joints overlapped. The construction of trundles (*fig. 4.*) has been sufficiently explained, except that they usually have an iron hoop fitted round the circular boards to prevent them from splitting: indeed many large face-wheels have the same. Small pinions are made out of one block of wood, and the cogs are fitted into it much in the same manner as the spokes are let into the nave of a coach-wheel. Iron-wheels either have the cogs cast in the same solid piece with the rim, or mortises are left in the castings for the reception of wooden cogs, as these are found to work much better. The wheel and its arms are sometimes cast in one piece, but for large wheels the rim and its arms are formed in two separate pieces and screwed together. The reason of this is, that in casting a large and extended piece of iron, it frequently happens that some parts will cool in the mould, and become solid before the others: consequently, from their contraction, these parts will be shorter than others which have retained their heat and fluidity longer. This circumstance happening to the arms of a wheel, will either warp the rim out of a true circle, or set the metal of one part upon a strain against another, so that the slightest blow or jar will cause them to snap in such parts. All this danger is avoided by making them in separate pieces, as in *fig. 8*: the end of each arm, as *A B*, has a flat expanded part, which lays against a proper socket within the rim *C D*, and is bolted to it. One-half of this wheel is delineated, with wooden cogs fitted in, at *C D*; and the other half, *F F*, shews the form of a rim, where the cogs and the arms *e f* are cast all in one piece. In the latter case the rim has a rib *g* within it for strength, in the same manner as all the arms have, and which is evidently shewn by the figure. In some situations it is necessary to fix wheels upon long shafts while they are in their places, and cannot conveniently be taken down: in this case such wheels may be made in two halves bolted together. *Fig. 9.* is drawn as if it were two halves of different kinds put together in this manner; the joint being up the middle of the arms *L, L*, and the connecting bolts are plainly shewn. By this method one wooden pattern, if very accurately made, will serve for casting both halves of the wheel. Cog-wheels are found to work with least friction, wear, or noise. When one has wooden, and the other iron cogs, dressed exceedingly smooth and true, the small wheel is usually made with the iron teeth, and the large one with the wooden ones. When such wheels are first set to work, the cogs are smeared with black lead mixed with tallow: this gives them a glossy surface, which greatly diminishes the friction. Hornbeam is found to be the best wood for the cogs, as it is not liable to split or splinter away by long wear. The cogs are held in by a pin driven through the tenon or tail, within the rim of the wheel. The wooden cogs are dressed by chisels to the marks set out, in the same manner as wooden wheels; but the iron cogs are first chipped with a cold chisel and hammer, and then filed true. The great labour of doing this induced Messrs. Boulton and Watts, some years ago, to erect machinery for dressing cogs. The wheel was provided with apparatus to hold it fast at the several divisions, and a strong slider, with a chisel fixed in it, was forced between the rough cogs by the revolution of a cam or heart,

with a sufficient power to cut away a shaving, and form the cog perfectly at twice repeating the operation. Some mechanics dispute the propriety of dressing iron cogs at all; they say, that the exterior surface of the castings have a kind of case-hardening, which is removed by the dressing, and a softer substance of metal exposed for the acting surfaces. This is true, and the objection would have its full force, if it were possible to make castings of wheels perfectly true in the circle, and all the cogs precisely the same size: but as the present state of the founder's art cannot insure this, it is best to chip and file the cogs; accuracy in the form of the teeth being a superior consideration to any quality of their substance. The wheel being made in either of these methods, must next be fixed, or *hung*, upon its shaft. Wheels are generally fixed fast upon their shafts or axes before their teeth are set out; or, if this is not convenient, they are fixed on a temporary spindle to set them out. When the wheel is made of wood, it is fixed upon the shaft, or a temporary axis, and turned round upon its pivots, while a chissel is laid on some fixed support to cut or turn its circumference to a true circle, or else to make a mark to which its rim may be reduced all round. The circumference is then divided, and mortises cut out for every cog; and when these are fixed in they are much larger than they are intended to be, that they may be set out, as above directed, and reduced to their true figure, without absolutely depending upon the accuracy of the mortises which receive them. Iron wheels are, as before-mentioned, treated in a different manner, being cast in the impression of a truly circular pattern made of wood; the cogs cast solid, with the rim or else mortises left all round for the reception of the wooden cogs: in either case the rim is a true circle, and must be fixed upon the shaft exactly by its centre, instead of forming the circumference to the centre, as in the wooden wheel. To do this, the centre hole through the iron wheel is made much larger than the shaft which is to go through it, and the space all round is filled up by iron wedges driven in; so that by means of these the wheel can be fixed exactly true in the centre (or in the round), and also in the flat that is truly perpendicular to the axis. The manner of arranging the wedges is shewn in *fig. 8*, where eight wedges are shewn by *a, a, a, a*, &c. round the shaft R. It is needless to explain how the wheel can, by means of these, be set exactly true, when it is found by turning round upon the pivots of its shaft that any one side of the circumference is farther from the centre than another. For the purpose of setting it square upon the shaft, each wedge-hole is provided with two wedges, one driven in from each side of the wheel, the two laying over each other in the notch or hole in the manner shewn at G. Thus, by gently driving one in, and the other a little outwards, the wheel may be very correctly rectified, if it has any deviation from the perpendicular. This is the usual manner of hanging wheels, and for large wheels it is the only applicable method. *Plate II, figs. 9 and 10*, is a far superior plan for such iron wheels as are not too large or heavy to be turned in a lathe upon a chuck, so that the centre is exposed, and may be bored through with a truly circular hole, and rather conical: of course the wheel is fixed upon the chuck, so that its circumference runs truly; and at the same time the centre is bored, the pitch circle is described upon the cogs, and sometimes the ends of the cogs are turned to reduce them to a true circle, and also the sides, that they may be exactly flat: for, as we have before observed, iron wheels, however true their teeth may be cast, should always have their cogs rather too large, and then be set out and dressed, by chisseling and filing, to make them perfectly correct to the lines thus

described. But to return to *fig. 9*; the wheel being prepared, and its centre bored out, the shaft is turned, as usual, to form its pivots, and, at the same time, the part which is to receive the wheel is turned conical, to fit the hole through the wheel, which being jammed thereon will certainly be true at once: and to prevent it from slipping round upon its axis various means are in use; sometimes a mortise is formed through the shaft A, at the small part of the cone, and a wedge *r* driven through, which is received in notches at the sides of the hole through the central part of the wheel, so that it holds the wheel from turning round on the shaft, at the same time that it drives it hard, and fixes it upon the conical fitting. Another method is to cut a channel along the conical part of the shaft parallel to the axis of it, and another similar one within of the hole through the wheel; then a fillet or feather of iron *s*, (*fig. 10*.) being inserted into the two grooves, effectually prevents the wheel from turning, unless the strain is so great as to cut the feather in two through its whole length, which is easily prevented by making it of a proper thickness. Another method of fixing a wheel is to have a flaunch, or flat shoulder, formed upon the shaft, and the wheel is drawn up against this by two, three, or four screw-bolts going through it, and also through the central part of the wheel, parallel to its axis. This plan is neither so neat, simple, nor strong as the former. When a wheel is required to be sometimes disengaged from its axis, the conical or cylindrical fitting is very convenient. In this case, the wheel should fit up against a flat shoulder, as *a*, in *fig. 11*, and at the opposite side should have a collet, or ring *b*, to confine it, and kept up by a key going through to the shaft R. In this way the wheel will slip round freely upon its axis, and communicate no motion thereto, though it is in constant motion itself: but when they are required to be connected, a locking bayonet, or clutch-box, is used. These pieces of mechanism are constructed in different forms; one of them is shewn in the figure. Strong arms A, A, are fixed fast on the shaft R, just before the wheel either by a circular fitting with a fillet, by a square, or they may be cast with it. Through the extremities of these arms holes are drilled to receive the shanks *f, f*, of the locking bayonet, which are fixed by nuts fast to an arm D, very nearly similar to A A, but it slides on the shaft, and has a central part *g*, with a circular groove round it, in the manner of a pulley, and a fork embracing the central piece in this groove gives the means of sliding the bayonets *f, f*, and D, upon the shaft, so that the points of its shanks intercept the arms of the wheel, so as to carry it round with them and the shaft; but when the points of *f, f* are drawn back clear of the arms of the wheel, it slips round freely upon the shaft. The clutch-box is rather different from this; it is a piece fitted upon the shaft with a fillet, so that it cannot slip round, but will slide endways upon it. The end of the piece is formed with several notches, or indentations across its face, which meet similar indentations in the face of the central part of the wheel, and thus unites the wheel and the shaft when the clutch is slid up to it; but the wheel is disengaged when the clutch is drawn from it. The construction of bearings for the support of pivots at the ends of shafts or spindles, is a matter of great importance in mill-work. The old kind of bearing called brasses is shewn in *fig. 12*. A lump of brass *a*, with a semicircular notch in it, was let into the piece of timber A, which was to support it; and two screw-bolts *b, b*, were fixed through the timber, being half received in notches formed in the sides or ends of the brass *a*: the upper brass, *b*, was exactly similar to the lower, and over it a plate of iron, *d*, was placed, with two holes through it to receive the two bolts *b, b*, and keep them

them together: the nuts *c, c*, upon the tops of the bolts confined the upper brads down, and made all fall neat tight. This kind of brads is not sufficiently strong or steady for all purposes, and, therefore, the bearing shewn in *fig. 13*, has taken its place: in this, *aa* is a cast-iron plate, which is held by two or more bolts *r, r*, down upon the timber or framing of the mill: this piece of cast-iron has two pieces *b, b*, rising up from it, between which a piece of brad, *z*, is brided, and has a semicircular notch in it. Another similar piece of brad is fixed into the cast-iron cap-piece B, which is fitted into the space between the two pieces *b, b*, and is drawn down by nuts upon the two bolts *c, c*. The brasses are prevented from getting out sideways by small fillets projecting from the middle of them, which are received into proper notches in the cast-iron work. In the same manner the cap B is fitted between the pieces *b, b*, with a tongue or fillet, and groove, so that it cannot deviate sideways, and then the bolts have only to draw the brasses down together. Sometimes a bearing of this kind is fitted up, so that it is adjustable in its position a little to adjust two wheels to work accurately with each other, or for other purposes where nicety is required. In this case, an iron plate, D, is bolted down to the framing, and the bearing, *aa*, lays upon it, the same bolts *r, r*, going through both, and also through the framing beneath; but the holes through which they pass in the piece *aa* are oblong, to admit the whole bearing being adjusted sideways. This is done by two wedges *o, o*, inserted at the ends of the piece *aa*, between the two ends of D, which rise up for the purpose, as at *nn*. The bearing rests upon two wedges at *g, g*, and is drawn down upon them by the bolts *r, r*. By these two wedges it can be raised up at pleasure, and by the other two, *o, o*, at the ends, it can be adjusted endways to set the bearing in the exact position required; and the bolts *r, r*, when screwed fast, hold all tight. The best way to make the interior surface of the brasses for a bearing exactly true, is to have them cast solid, that is, the two halves of the brads in one, with a notch which very nearly, but not quite separates them. In this state it can be chucked in a chuck-lathe, and the inside bored or turned out true: then it may be sawn in two halves, and put into its place, to which it should have been previously fitted. Sometimes the bearing is all fitted together and screwed down in its place, and a borer is used to bore or broach out the hole for the brasses, the same as is employed to bore pump barrels. Brads is found, by experience, to be the best substance to form bearings for a cast-iron gudgeon, having the least friction, and, consequently, least wear, of any other substance which can be used. To diminish this friction still farther, friction-wheels are sometimes used. The manner of constructing these, when merely required to support a gudgeon, leaving its own weight to keep it down in its place upon them, is shewn in *fig. 14*. Here *AA* is an iron plate, which is to be bolted down upon the framing: it has holes through it to receive the friction-wheels B, B, and supports bearings *a, a*, for their pivots raised up to a proper height, and provided with sockets for brasses, in which the pivots of the friction-wheels are to lie. The two friction-wheels B, B, as is evident, lie by the side of each other, and the gudgeon, D, of the shaft they are to bear lies upon and between them, so that when it turns round it rolls upon them, or rather, their circumferences move with it, and, consequently, the pivots of the friction-wheels move so slowly, as to diminish the friction very materially, the proportion depending on the relation between the diameters of the wheels B and the gudgeon D. This is not the best kind of friction-wheels, though the simplest. *Plate II.*

fig. 15. of Mill-work, contains a view of another kind, called

friction-rollers: here *AA* is an iron plate bolted down to the framing, and an iron ring, B, rises up from it, all cast in one piece. The interior surface of this ring is turned in the lathe with the greatest accuracy, and the pivot or gudgeon C, which is also turned true, rests in the centre thereof, being supported by its rollers *a, a*, &c. arranged at equal distances round it, and of such a diameter as to exactly fill up the space all round between the gudgeon and the ring. The rollers, it is evident, must be made all of one exact diameter, and extremely true, and they must fill up the space: then the gudgeon being turned round acts upon these rollers, and turns them round also at the same time by this motion. As they have no fixed centre, they also roll round within the ring B, in the same direction as the motion of the gudgeon, but with a very slow motion, which will be in proportion to the relative diameters of the gudgeon C and the ring B. By this means nearly all the friction is avoided, nothing like the sliding of a gudgeon round upon its bearing taking place here; it is all rolling of one surface upon another: and as the contact of two cylinders, supposing them hard, is but a line, the friction, or more properly adhesion, is exceedingly small; and at the same time that the gudgeon is as strongly supported as possible: but this depends upon the hardness of the matter of the gudgeon, the rollers, and the ring B. If the ring and gudgeon are made of hard cast iron, and the rollers of steel at a spring temper, it will act extremely well, though the strain or weight upon the rollers be very great. For light strains softer substances might be used, but not to so good an effect.

The manner of keeping all the rollers at their relative distances from each other, in the ring B, that they may not run against each other, is yet to be explained. Each roller, as shewn at *z*, has a groove turned in it in the middle of its length, so as to reduce it to a small neck in the centre: then an iron ring, L, is provided, which has six holes drilled in it, in the proper positions for the centres of the rollers, that is at equal distances round a circle, which is as much less than the ring E as the diameter of the rollers, or the same quantity larger than the diameter of the gudgeon C. These holes are made to fit the small neck in the centre of the rollers, and to get them in, the holes are cut open from the outside of the ring, so as to become notches; then the rollers being put into them, are all in one cluster, and in this state are introduced into the ring E. They will now be kept at their proper distances asunder, and when the gudgeon C is introduced between them, they will all take their proper places, and lie truly parallel. It is to be observed that the holes or notches in the ring L, do not exactly fit the necks of the rollers, which have therefore considerable play, and but very little friction, for it is not essential to keeping the rollers at their relative distances that this ring should be used, but it will prevent the danger of their getting wrong by accident. To prevent any dust or dirt getting in, which would completely destroy the action of this ingenious mechanism, a circular iron plate is fitted into the ring B, on each side, and both are fixed by small screws going through the ring. One of the plates N must of course have a hole through the middle, to admit the gudgeon. The joints of these plates should be water tight, and then a quantity of oil being poured in, will remain in the bottom of the ring B, and every roller, as it passes, will be kept oiled; though this is no ways necessary to their action. The end plate, which is not perforated, will make a stop to prevent the gudgeon moving endways, and the two plates will keep the rollers from shifting their position on end; but to prevent friction, if ever they come in contact, the ends of the roller should be rather convex, as shewn at *z*, that they may touch in the

centre rather than the outsides; but they will never bear hard against the plate, having no drift that way.

A patent was taken out for these friction rollers many years ago, and a large manufactory was established for making them for various purposes, as carriage and waggon-wheels, the gudgeons of heavy water-wheels, &c.: they were found to possess great advantages, having scarcely any sensible friction when in motion, but were liable to get out of order chiefly from the entrance of dust, which occasioned the rollers to wear out of the round more on one side than the others; and if once by this accident the rollers stood still for an instant, the gudgeon wore a flat place in the two rollers beneath it, and they would never run round again: a very little time would wear this flat side so deep as to stop the rollers, because of the very small surfaces in contact with the gudgeons. For delicate purposes, where hardened steel can be employed for all the rollers and the ring, they are a most admirable contrivance, and the above objections will then apply very slightly; but, as before mentioned, their perfection and durability will ultimately depend upon the hardness of the substances employed.

Fig. 16. represents a fruit of friction rollers for supporting the weight of a heavy vertical shaft, as a horse-wheel, a horizontal wind-mill, a capstan fugar-mill, &c. *A A* is a plate supporting the weight of the shaft; it has a conical eminence upon it, and a hole in the centre of this, which exactly fits the pivot or gudgeon *c*, at the bottom of the shaft *R*: upon this gudgeon a conical plate *B* is formed, exactly of the same shape and size as the conical part of the plate *A*, and between these two plates three or four rollers *a, a*, are situated, and bear the weight of the shaft *R*, or whatever presses upon the plate *B*. The rollers are kept at proper distances asunder by a ring, shewn separate at *L*, with three arms, *n*, projecting from it, which being formed into spindles, pass through the centres of the rollers *a*, and have collets and cross keys to keep them on. In this manner, as the gudgeon and plate *B* turn round, the plate rolls upon the rollers *a, a*, keeping always in the true centre, by the end of the gudgeon *c* fitting the hole in the centre of the plate *A A*; but the weight is supported by the rollers *a, a*, which, at the same time that the upper plate rolls upon them, they roll upon the lower, and thus very considerably diminish the friction which any other kind of gudgeon would have in such a situation.

Shafts.—In almost all modern mills, the shafts or spindles for the conveyance of motion, and support of wheels, are made of iron, either wrought or cast. Square shafts are the most common, but sometimes octagon and round ones are used; and if they are very large, they are cast hollow, like pipes, and the gudgeons fixed in at the ends by wedges; but the pivots should always, if possible, be formed of the same piece of metal, as the slightest possible deviation from the straight line causes them to strain, and work very irregularly in their bearings. In wooden shafts this is impracticable, and it is one of the greatest objections to the use of them. The best method of fixing gudgeons into wooden shafts is shewn in *fig. 17*. Here *A* is the gudgeon, made in cast iron, turned true; it has four leaves, *a, b, c, d*, forming a cross, which is let into the end of the wooden shaft *R*: the front edge of each leaf is considerably thinner than the back, so that a pair of strong iron hoops *r r* being driven tight on the end of the shaft, closes the wood round the cross, and holds it fast, and the back of the leaves being wider than the front, it will not come out. As an additional security, screws are sometimes put in: these are put through holes in the arms of the cross, which are then made flat the other way, and do not go so far into the wood. The screws go into the timber a considerable distance, where a mortise is cut into the wood, to meet

the end of the bolt, and an iron nut is dropped in, to screw the bolt into, when it is turned round by a screw driver. By this contrivance a gudgeon may be fitted into a wooden shaft very fast, but still it will never come into competition with iron shafts, when the gudgeon is made all in one solid piece with the whole of the shaft. A judicious mechanic will never make more than two bearings upon any one shaft, if it can be avoided, because if the three, by any means, as the warping of the frame work, or other cause, get the smallest possible quantity out of the straight line, they can never work well afterwards, but will always strain and wear the bearings with great friction. In very extensive mills, such as woollen and cotton mills, breweries, &c. when the buildings are of great length, it becomes necessary to join several shafts together in length, to reach from one end to the other of a mill. The manner of making the joinings is of some consequence: it is necessary that every shaft should have a bearing at each end, and consequently that the connection of the ends of every one should be made by uniting the ends of the shafts which project beyond their bearings. This can be done in various ways: one is by having the ends of each of the shafts provided with circular heads (see *A B fig. 18.*), which have teeth in one, and corresponding indentations in the other, to receive them, and thus one is made to turn the other about, at the same time that if any slight settlement of the building or other cause depresses one of the bearings, or raises another, so as to put the two shafts out of the perfect straight line they ought always to preserve; these joints will admit the slight flexure, and still communicate the motion of one shaft to the other.

As this accidental settlement in large buildings is almost unavoidable in some degree, care should be taken to make such joints as will admit of a trifling bending. Sometimes the ends of the shaft are made circular, and turned quite true in the lathe; then a metal tube or collar is fitted truly upon both to cover the joint, and connect them, a bolt being put through each end, which unites both shafts with the collar, and thus by means of it causes one to turn the other round. This method is sometimes used to save the great expence of having a bearing at each end of every length of shaft, one bearing to each length being then sufficient, the other end of the shaft being supported by this collar, connecting it with the end of the adjacent length just where it projects beyond its bearing. But this is not a good method, as the shafts are apt to bend and work with so much friction in the bearings, if they get the least out of the straight line, because these kind of joints will not admit any flexure of the shaft, or if they do, they will only bend on one side, whereas it is necessary for the joint to bend successively on all sides, when the bearings are not precisely in a straight line. *Plate III. fig. 19.* represents a coupling-box, used by Mr. Murray of Leeds, for connecting the lengths of a long line of shaft which are to carry a heavy strain: it is so made that it will communicate the motion in the manner of an universal joint, if they should be out of the line. Let *A, B*, be the two shafts to be united; *C, D*, their necks or collars which lay in the bearings: the ends projecting beyond these have boxes *E, F*, fixed on them, either by a square with wedges, or by a round part with a fillet: one of these boxes, *E*, has a piece projecting from the inside of it on each side, and extending into the other box, as is shewn at *a a*, (*No. 2.*), which is an inside view: the other box, *F*, has two similar pieces projecting from it at *b b* into the other box *E*: within the boxes an iron cross *c c d d* is situated; it has screws fixed into the ends of the cross, and by these the motion is communicated: thus, the pieces *a, a*, when the shaft *A* and box *E* are turned round in the direction of the arrow (*No. 2.*) act against the screws *c, c*, of the cross, and turn it

it about : at the same time the other two screws *d, d*, at the other arms of the cross press against the pieces *b, b*, which belong to the box *F* and shaft *B*, thus turning them round : the cross is placed quite detached in the boxes, and thus acts as an universal joint, to communicate the motion of one to the other : the screws *c, d, d*, at the ends of the crosses are only put in that the acting points may be made of steel, and made smooth to have but little friction in these parts. Another method of uniting shafts by Mr. Murray is shewn at *fig. 20* : it has the advantage of requiring only one bearing for every length of shaft, whereas the above method requires one for each end of every length. *A, B*, represent the two shafts ; each has a pivot formed at the end : these pivots are fitted into a coupling piece *C D E*, which is bored out truly to fit them inside, and the outside turned true, with a neck *D D*, which is received and fitted into a bearing : the two shafts *A, B*, are connected with the coupling piece *D*, at *C* and *E*, by means of a cross key *lm*, put through each shaft, and the ends of them received in notches made within side of the coupling piece at *C* and *E*, where it receives the ends of the shafts. It is to be observed that the shafts do not fit tight in these parts *E* and *C*, but only in the pivots *a, b*, within, by which means they have liberty of a little motion, and this without straining the bearing in which *D* runs, because it is only the short coupling piece which is received therein ; and consequently, any trilling deviation from the straight line will not strain it, because of the play allowed in the fittings.

The universal joint, called also Hooke's joint, from its inventor Dr. Hooke, is a method of uniting shafts, which permits them to be rather inclined to each other. This is shewn in *fig. 21*, where *A, B*, are the two shafts, with necks to be received in bearings : each shaft beyond this is formed into a fork, as *C* and *D* ; and these are united by a cross of iron *E*, or sometimes a ring, in which four pins are inserted, and pass through holes in the ends of the forks. On one or other of these pins the joint will bend in any direction, on the same principle as a compass hangs in its gombals, and will communicate a rotative motion from one shaft to the other, when they are rather inclined ; but this inclination should be small, or else the joint will not act well, or without great friction, and irregularity of motion. If an angle of more than 15 degrees from the straight line is required, a pair of slightly bevelled wheels are best.

The regulation of the velocity of a mill is a matter of considerable importance, to preserve an uniformity of motion, either when the force of the first mover is fluctuating, or when the resistance or work of the mill varies in its degree : either or both of these causes will occasion the mill to accelerate or diminish its velocity ; and in many instances it will have a very injurious effect upon the operations of the mill. Thus, in a mill for spinning cotton, wool, flax, &c. driven by a water-wheel, are a multiplicity of movements, many of which are occasionally disengaged, in different parts of the mill, for various purposes. This tends to diminish the resistance to the first mover, and the whole mill accelerates. Or, on the other hand, the head of water, which drives the wheel, may be liable to rise and fall suddenly, from many causes, which great and rapid rivers are subject to, and cause similar irregularities in the speed of the wheel. For such cases, judicious mechanics have adopted contrivances, or regulators, which counteract all these causes of irregularity ; and a large mill, so regulated, will move like a clock, with regard to its regularity of velocity. These regulators are usually termed *governors*, and are made on different principles. Those most generally used are called flying-balls, operating by the centrifugal force of two heavy balls, which are connected and revolve with a vertical axis. *Fig. 22.* re-

presents the simplest form of this ingenious apparatus : *A A* is the vertical axis, which is constantly revolving by the machinery ; at *a a* two arms or pendulums, *a b, a b*, are jointed, and carry at their extremities a heavy metal ball each, as *b b* ; from the pendulums two chains or iron rods, *d, d* proceed, and suspend a collar *e*, which slides freely up and down the axis, and has a groove formed all round it, in which the end of a forked lever, *D*, is received ; and thus the rising and falling of the collar, *e*, produces a corresponding motion of the end of the lever *D* ; but the collar is always at liberty to turn round with the axis freely within the fork, at the extremity of the lever. The operation of the governor is this : when the vertical axis is put in motion, the centrifugal force of the balls, *b, b*, causes them to recede from the centre ; and as this is done both together, they cause the collar, *e*, and the end of the lever to rise up : the balls fly out to a certain height, and there they continue as long as the axis preserves the same velocity ; as it is the property of a pendulous ball, like *b*, to make a greater effort to return to the perpendicular, in proportion as it is removed farther from it, in consequence of the suspending rod being more inclined, and bearing less of its weight. The weight of the balls to return to the axis may be considered as a constantly increasing quantity ; while the quantity of the centrifugal force, causing them to recede from the axis, depends exactly upon the velocity given them. But this velocity increases as they open out, (independently of any increased velocity of the axis,) in consequence of their describing a larger circle. The combination of these oppositely acting forces causes the governor to be a most sensible and delicate regulator. Thus : suppose the balls hanging perpendicular, put the axis in motion with a certain velocity, the centrifugal force will cause the balls to fly out ; and this increasing their velocity, (by putting them farther from the centre, and causing them to revolve in a larger circle,) gives them a greater centrifugal force, which would carry them still farther from the centre, but for the counteracting force, *viz.* the weight of the balls tending to return. This is, as before stated, an increasing quantity, and consequently these opposite forces come to a point where they balance each other ; that is, the balls fly out till their weight to return balances the centrifugal force. But if the slightest alteration takes place in the velocity of the axis, the equilibrium is destroyed by the increase or diminution of the centrifugal force, and the balls alter their distance from the centre accordingly, and by elevating or depressing the end of the lever, operates upon some part of the mill to rectify the cause of the irregularity. In a steam-engine, the lever acts upon a vane or door situated in the passage of the steam from the boiler to the cylinder ; and if the mill loses in velocity, from an increase of resistance, the balls fall together a little ; and the consequent fall of the lever opens the door, or throttle valve a little wider, and gives a stronger supply of steam to restore the mill to its original velocity. On the other hand, if the mill accelerates, the balls open out and then close the vane, so as to moderate the supply of steam. See a more full description of this under *STEAM-Engine*.

A water-wheel is not so easily regulated by the governor, because the shuttle of a large wheel requires a much greater force to raise or lower it, when the water is pressing against it, than the lever, *D*, can at any time possess ; it therefore becomes requisite to introduce some additional machinery, which has sufficient power to move the shuttle, and this is thrown, in or out of action, by the flying balls. The simplest contrivance, and that which we believe was the regulator first used for a water-wheel, was erected at a cotton mill at Belper, in Derbyshire, belonging to Mr. Strutt.

MILL-WORK.

A square well, or large cistern, was situated close by the water-wheel: it had a pipe leading from the mill-dam into it, to admit water; and another pipe from it to the mill-tail, to take the water away: both were closed at pleasure by cocks or sluices. Within the well was a large floating chest, very nearly filling up the space: it of course rose and fell with the water in the cistern, and had a communication by rack and wheel-work with the machinery for drawing the shuttle, so that the rise and fall of the floating chest elevated and depressed the shuttle of the wheel. The lever of the governor was connected with the cocks in the two pipes, in such a manner that when the mill was going at its intended velocity, both of the cocks were shut; but if the water-wheel went too slowly, the falling of the balls and descent of their lever, D, opened the cock in the pipe of supply, and, by letting water into the well, raised the float, and, with it, the shuttle, to let more water upon the wheel, till it acquired such a velocity that the balls began to open out again, and thus shut the cock: on the other hand, if the mill went too fast, the balls opened the pipe of exit from the well, and then the sinking of the float closed the shuttle till the true velocity was restored.

Since this first application of the regulator to the water-wheel, the manner of its operation has been greatly varied; and as the same mechanism is applicable to any kind of mill-work, we shall give a slight sketch of it. Suppose A, *fig. 23*, an axis, receiving its motion from the mill by wheel-work; it is provided with a pair of governors, *ab, ab*, constructed like those before described; and at the lower part of the spindle is a bevilled wheel, R, turning two others, B and C, situated upon one spindle, D, which goes away, and communicates motion to the racks of the shuttle; the wheels, B and C, are neither of them fixed to the spindle D, but both slip round freely upon it, turning in contrary directions, as they receive motion from the opposite sides of the wheel R. A locking clutch, *d*, is fitted upon the spindle between these two wheels, B, C, and can, by moving it one way or the other, be made to lock either one of the wheels to the spindle D, at the same time that it leaves the other disengaged. The locking-box is moved by means of a lever, shewn in *fig. 24*; the arm *m*, having a fork to embrace a groove in the box; the lever is fixed on a vertical axis *n*, which has at the upper end two other levers, *o, p*: these lay one on each side of the vertical axis A, but at different heights, as is evident from the figure. The collar *e*, which is raised up when the balls fly out, is fitted upon a square part of the spindle A, and is formed like a snail or cam, which will act upon either of the levers, *o* or *p*, according to the height at which it hangs upon its spindle. Now when the mill is going with its true velocity, this cam, *e*, is at such a height that it is beneath one lever, *o*, and above the other, *p*, so as to interfere with neither; consequently the locking-box, *d*, remains detached: but on any alteration in the velocity of the mill and the axis A, the balls open or shut, as before explained, and the cam, *e*, either rises or falls, and then it presses against one of the levers, *o* or *p*, and by pushing it away from the axis, it moves the lever *m*, and the locking-box *d*, up to one of the wheels, B or C, which it locks to the axis D, and turns it round in the direction of that wheel's motion, by which it either raises or depresses the water-wheel's shuttle, as is required. This apparatus may, it is plain, be applied to any other kind of mill-work.

Governors or flying-balls are very frequently used in the wind-mills employed for grinding flour: the variable force of this first mover renders some such regulator necessary, to increase the resistance, by allowing a greater feed of corn,

when the mill moves too quickly, and thus in some degree counteracting the irregularity. If the mill moves too slowly, the balls tend to diminish the feed, and at the same time they raise the upper stone, to set them at a greater distance asunder, that they may require less power to drive them, and consequently suffer the mill, as nearly as it can, to retain its full velocity, though the motive force is greatly diminished. This application of the governor was, we believe, first made by the ingenious captain Hooper of Margate, who invented the horizontal wind-mill. (See *WIND-MILL*.) It is a very great advantage, and no wind-mill should be without them. Many wind-mills are provided with flying-balls, which, by very ingenious mechanism, clothe and unclothe the sails just in proportion to the strength of the wind.

In many mills it is of consequence to be able to detect small variations in the velocity, and to ascertain the quantity of them; for the governor only corrects the irregularities, without shewing any scale of them. In cases where this is required, it may be done by a very ingenious instrument, invented by Mr. Bryan Donkin of Fort-Place, Bermondsey. He received a gold medal from the Society of Arts, Manufactures, and Commerce, in 1810, for this instrument, which he calls a tachometer.

A front view of this instrument is represented in *fig. 25*, and a side view in *fig. 26*, of *Plate II*. XYZ, *fig. 25*, is the vertical section of a wooden cup, made of box, which is drawn in elevation at X, *fig. 26*. The whiter parts of the section, in *fig. 25*, represent what is solid, and the dark parts what is hollow. This cup is filled with mercury up to the level LL, *fig. 25*. Into the mercury is immersed the lower part of the upright glass tube AB, which is filled with coloured spirits of wine, and open at both ends, so that some of the mercury in the cup enters at the lower orifice, and, when every thing is at rest, supports a long column of spirits, as represented in the figure. The bottom of the cup is fastened by a screw to a short vertical spindle D, so that when the spindle is whirled round, the cup (whose figure is a fold of revolution) revolves at the same time round its axis, which coincides with that of the spindle.

In consequence of this rotation, the mercury in the cup acquires a centrifugal force, by which its particles are thrown outwards, and that with greater intensity, according as they are more distant from the axis, and according as the angular velocity is greater. Hence, on account of its fluidity, the mercury rises higher and higher as it recedes from the axis, and consequently sinks in the middle of the cup; this elevation of the sides and depression in the middle increasing always with the velocity of rotation. Now the mercury in the tube, though it does not revolve with the cup, cannot continue higher than the mercury immediately surrounding it, nor indeed so high, on account of the superincumbent column of spirits. Thus the mercury in the tube will sink, and consequently the spirits also; but as that part of the tube which is within the cup is much wider than the part above it, the depression of the spirits will be much greater than that of the mercury, being in the same proportion in which the square of the larger diameter exceeds the square of the smaller.

Let us now suppose, by means of a cord passing round a small pulley F, and the wheel G or H, or in any other convenient way, the spindle, D, is connected with the machine whose velocity is to be ascertained. In forming this connection, we must be careful to arrange matters, so that when the machine is moving at its quickest rate, the angular velocity of the cup shall not be so great as to depress the spirits below,

C, into

C, into the wider part of the tube. We are also, as in the figure, to have a scale of inches and tenths applied to A C, the upper and narrower part of the tube, the numeration being carried downwards from zero, which is to be placed at the point to which the column of spirit rises when the cup is at rest.

Then the instrument will be adjusted, if we mark on the scale the point to which the column of spirits is depressed when the machine is moving with the velocity required. But, as in many cases, and particularly in steam-engines, there is a continued oscillation of velocity; in those cases we have to note the two points between which the column oscillates during the most advantageous movement of the machine.

Here it is proper to observe, that the height of the column of spirits will vary with the temperature, when other circumstances are the same. On this account the scale ought to be moveable, so that, by slipping it upwards or downwards, the zero may be placed at the point which the column reaches when the cup is at rest, and thus the instrument may be adjusted to the particular temperature with the utmost facility, and with sufficient precision. The essential parts of the tachometer have now been mentioned, as well as the method of adjustment; but certain circumstances remain to be stated.

The form of the cup is adapted to render a smaller quantity of mercury sufficient than what must have been employed either with a cylindrical or hemispherical vessel. In every case two precautions are necessary to be observed. First, that when the cup is revolving with its greatest velocity, the mercury in the middle shall not sink so low as to allow any of the spirits in the tube to escape from the lower orifice; and that the mercury, when most distant from the axis, should not be thrown out of the cup. Secondly, that when the cup is at rest, the mercury shall rise so high above the lower end of the tube that it may support a column of spirits of the proper length.

Now, in order that the quantity of mercury, consistent with these conditions, may be reduced to its minimum, it is necessary, first, that if M M (*fig. 1.*) is the level of the mercury at the axis when the cup is revolving with the greatest velocity, the upper part M M X Y of the cup should be of such a form as to have the sides covered only with a thin film of the fluid; and secondly, that, for the purpose of raising the small quantity of mercury to the level L L, which may support a proper height of spirits when the cup is at rest, the cavity of the cup should be, in a great measure, occupied by the block K K, having a cylindrical perforation in the middle of it for the immersion of the tube, and leaving sufficient room within and around it for the mercury to move freely, both along the sides of the tube and of the vessel.

The block, K K, is preserved in its proper position in the cup or vessel X Y Z, by means of three narrow projecting slips or ribs, placed at equal distances around it, and is kept from rising or floating on the mercury by two or three small iron or steel pins inserted into the underside of the cover, near the aperture through which the tube passes. It would be extremely difficult, nor is it by any means important, to give to the cup the exact form which would reduce the quantity of mercury to its minimum; but we shall have a sufficient approximation, which may be executed with great precision, if the part of the cup above, M M, is made a parabolic conoid, the vertex of the generating parabola being at that point of the axis to which the mercury sinks at its lowest depression, and the dimensions of the parabola will be determined in the following manner. Let V G (*fig. 27.*) represent the axis of the cup, and V the point to which the mer-

cury sinks at its lowest depression: at any point, G, above V, draw G H perpendicular to V G; let n be the number of revolutions which the cup is to perform in t'' , at its quickest motion; let v be the number of inches which a body would describe uniformly in t'' , with the velocity acquired in falling from rest through a height m to G V,

and make $G H = \frac{v}{314 n}$. Then the parabola to be deter-

mined is that which has v for its vertex, V G for its axis, and G H for its ordinate: at G the cup has a lid to prevent the mercury from being thrown out of it, an event which would take place with a very moderate velocity of rotation, unless the sides were raised to an inconvenient height; but the lid, by obstructing the elevation of the sides of the cup, will diminish the depression in the middle, and, consequently, the depression of spirits in the tube: on this account, a cavity is formed in the block immediately above the level L L, where the mercury stands when the cup is at rest, and thus a receptacle is given to the fluid which would otherwise disturb the centrifugal force, and impair the sensibility of the instrument.

It will be observed, that the lower orifice of the tube is twisted upwards. By these means, after the tube has been filled with spirits, by suction, and its upper orifice stopped with the finger, it may easily be conveyed to the cup, and immersed in the quicksilver, without any danger of the spirits escaping, a circumstance which otherwise it would be extremely difficult to prevent, since no part of the tube can be made capillary, consistently with that free passage to the fluids which is essentially necessary to the operation of the instrument.

We have next to attend to the method of putting the tachometer in motion, whenever we wish to examine the velocity of the machine. The pulley F, which is constantly whirling during the motion of the machine, has no connection whatever with the cup, so long as the lever, Q R, is left to itself. But when this lever is raised, the hollow cone T, which is attached to the pulley, and whirls along with it, is also raised, and, embracing a solid cone on the spindle of the cup, communicates the rotation by friction. When our observation is made, we have only to allow the lever to drop by its own weight, and the two cones will be disengaged, and the cup remain at rest.

The lever, Q R, is connected, by a vertical rod, to another lever S, having at the extremity, S, a valve, which, when the lever, Q R, is raised, and the tachometer is in motion, is lifted up from the top of the tube, so as to admit the external air upon the depression of the spirits. On the other hand, when the lever, Q R, falls, and the cup is at rest, the valve at S closes the tube, and prevents the spirits from being wasted by evaporation.

It is, lastly, to be remarked, that both the sensibility and the range of the instrument may be infinitely increased; for, on the one hand, by enlarging the proportion between the diameters of the wide and narrow parts of the tube, we enlarge, in a much higher proportion, the extent of scale corresponding to any given variation of velocity; and, on the other hand, by deepening the cup, so as to admit, when it is at rest, a greater height of mercury above the lower end of the tube, we lengthen the column of spirits which the mercury can support, and, consequently, enlarge the velocity which, with any given sensibility of the instrument, is requisite to depress the spirits to the bottom of the scale. Hence the tachometer is capable of being employed in very delicate philosophical experiments, more especially as a scale might be applied to it indicating equal increments of velocity.

velocity. But, in the present account, it is merely intended to state how it may be adapted to detect, in machinery, every deviation from the most advantageous movement.

MILLAH, in *Geography*, a mountain of Algiers; 15 miles S.W. of Tiffesh.

MILLAINS, according to Mr. Wingate, are the third subdivision of the primes in Gunter's line; and express the thousandth part of such primes.

MILLAR, JOHN, in *Biography*, professor of law in the university of Glasgow, was born, in 1735, in the parish of Shorts, in Lanerkshire. He received his grammar education at the school of Hamilton, whence he was removed at the age of eleven to Glasgow. He was designed for the church, but the freedom of his enquiries having inspired him with a disinclination to fetter himself by subscription to articles of faith, he turned his thoughts to the bar, and his father acquiesced in the change. After he had finished his studies at Glasgow, he passed about two years in the family of lord Kames as tutor to his son, and derived much information and improvement from his connection with that eminent lawyer. At this period he contracted an acquaintance with David Hume, to whose metaphysical opinions he became a convert, though he materially differed from him upon political topics. In 1760 Mr. Millar began to practise at the bar. He was regarded as a rising young lawyer, when he thought proper to terminate his professional career by becoming a candidate for the vacant professorship of law at Glasgow. To this post he was appointed in 1761, and immediately began to execute its duties. Previously to his appointment the students of the law-course seldom exceeded four or five in number, but his reputation produced such an accession in a few years, that they frequently amounted to forty, and the pupils upon his lectures on government were much more numerous. He lectured in English, and spoke fluently with the assistance of mere notes only. By this method his lectures were rendered full of variety and animation, and at the conclusion of each he was accustomed to explain the difficulties and objections that had presented themselves to his pupils, in a free and familiar conversation. His business as professor was that of commenting upon the institutions and pandects of Justinian, but to this he subjoined a course of lectures on jurisprudence, or the general principles of law, as existing in the codes of all civilized nations: he likewise employed an hour thrice a week in lectures on government, and twice a week on the law of Scotland. A spirit of investigation had given birth to a literary society among the clergy and professors of Glasgow, of which Mr. Millar became an active member. Few men were more ready at discussions of the philosophical kind, and all the branches of science connected with the study of the human mind were extremely familiar to him. In 1771 he published a treatise on "The Origin of the Distinction of Ranks," which contained a view of the changes produced in the several relations of society by the gradual progress of civilization and improvement. It was well received by the public, and has gone through several editions. The copy now before us is one of the third edition, and was published in 1781. The treatise is divided into distinct chapters, which are subdivided into several sections, and in these subjects of much interest and great importance are discussed. The first chapter treats "Of the Rank and Condition of Women in different Ages;" the second "Of the Jurisdiction of a Father over his Children;" the third and fourth "Of the Authority of Chiefs and Sovereigns;" the fifth "Of the Changes produced in the Government of a People, by their Progress in Arts and in polished Manners;" the sixth "Of the Authority of a Master over his Servants."

Mr. professor Millar's enquiries into the English government, which made an important part of his lectures, together with a zealous attachment to the principles of liberty, led him to publish in the year 1787 the first volume of an "Historical View of the English Government," in which he traces the progressive changes in the property, the state of the people, and the government of England, from the settlement of the Saxons to the accession of the house of Stuart. This volume, which is replete with ingenious and profound speculations, would have been followed by a second, bringing down the history to the present time, had not the events which, soon after the publication of this work, passed on the theatre of Europe, so completely arrested the attention of the public, as almost to sink the importance of past forms of government, in the superior interest of those which were expected to arise!

Mr. Millar was an early, active, and persevering advocate for the abolition of the slave-trade, which, in his opinion, could never be palliated, far less justified, by any regulations, either respecting the transport of slaves from Africa to the West Indies, or their treatment, however mild, after their arrival. While he considered domestic slavery as the greatest curse that can befall a nation; as equally subversive of the morals of all ranks in society, he was by no means indifferent to the evils of political slavery. He viewed the attempt to tax America, as an attack on the just rights of the Colonies, and he dreaded the subjugation of that country, as a decisive step towards the overthrow of British freedom. When the French revolution, to which we have already alluded, astonished the world, he was one of those who, without entering into the wild speculations it occasioned, saw in prospect the benefits it apparently promised to Europe; and on that account hailed it as the happiest event that could have happened to the human race. To the deep regret, excited by succeeding horrors, there was, we are told, always joined in his mind, a sentiment of the most profound indignation against that coalition of continental kings, to which he thought they might be justly ascribed.

Among the parties that have divided the present reign, Mr. Millar attached himself to that of the Whigs, and particularly to that branch of them which had first the marquis of Rockingham, and afterwards Mr. Fox at their head. He always warmly supported their principles through all the vicissitudes of administration and public opinion. He was ever suspicious of power, and was a zealous friend to all attempts for restraining the increase of the power of the crown. It was probably in consequence of his jealousy of authority, that, in the limited degree in which he still followed the profession of an advocate, he made it a constant practice to appear on the circuits as counsellor for criminals; and few pleaders surpassed him in the acuteness with which he examined evidence, and the force with which he addressed the feelings of juries. Mr. Millar's researches were by no means confined to politics and law. He was an able and profound metaphysician: his acquaintance with the works of imagination, both ancient and modern was also very extensive, and his criticisms were at once ingenious and solid, evincing an admirable union of acuteness of understanding with an elegant and correct taste. He died on the 30th of May 1801, at the age of 69, leaving behind him several manuscripts, from which, in 1803, were printed, in two volumes, his posthumous works, consisting of an historical view of the English government from the accession of the house of Stuart, and some separate dissertations connected with the subject. Of the style of Mr. Millar's works, it is sufficient praise to say in the words of his biographer, that, "perhaps it would be impossible to find a sentence which can require

require a second perusal to be distinctly understood." Monthly Magazine, vol. ii. See also "An Account of the Life and Writings of John Millar," esq. prefixed to the fourth edition "Of the Origin of the Distinction of Ranks."

MILLARES, or MILLAS, in *Geography*, a town of Spain, in the province of Valencia, on the Xucar; 18 miles N.W. of St. Felipe.

MILLAS, a town of France, in the department of the Eastern Pyrenees, and chief place of a canton, in the district of Perpignan; 9 miles W. of Perpignan. The place contains 1361, and the canton 7029 inhabitants, on a territory of 137½ kilometres, in 9 communes.

MILLEA, in *Botany*, a genus named by Cavanilles in honour of Mr. Julian Milla, head gardener of the Royal Botanical Garden at Madrid.—Cavan. Ic. v. 2. 76. Willd. Sp. Pl. v. 2. 62.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronaria*, Linn. *Lilia*, Juss.

Gen. Ch. *Cal.* Perianth none. *Cor.* of one petal, funnel-shaped; tube elongated, straight; limb spreading, deeply cloven into six, ovate segments, the alternate ones narrower, and tipped with a short, hooked appendage. *Stam.* Filaments scarcely discernible; anthers six, oblong, erect and approaching each other, almost sessile, opposite to the segments of the corolla, and inserted into the upper part or throat of the tube. *Pist.* Germen superior, on a very long stalk, triangular, inclosed in the tube; style thread-shaped, prominent; stigmas three, globular, covered with thick hairs. *Peric.* Capsule oblong, triangular, of three valves and three cells. *Seeds* many in each cell, ovate, pointed, compressed into the shape of a little bag.

Obf. Cavanilles says that the germen being superior, the tube elongated and straight, the anthers nearly sessile and approaching each other, added to the deficiency of a calyx and nectary, are sufficient marks to render our present plant distinct from *Panacratium*, *Amaryllis*, *Crinum* and *Agapanthus*, to all which genera in other respects it seems to have some affinity.

Ess. Ch. Corolla funnel-shaped; with a flat limb, deeply six-cleft. Anthers inserted into the throat of the tube. Germen stalked. Capsule of three cells, with many seeds.

1. *M. biflora*. Willd. n. 1. Cavan. Ic. v. 2. t. 196.—A native of Mexico. It flowers and bears seed in the garden at Madrid in October. *Root* an ovate bulb, with very fleshy oblong fibres, covered with a thin, reddish skin. *Radical-leaves* a foot high or more, awl-shaped, sometimes furrowed on the inner side, smooth and generally longer than the scapus. *Stalks* scarcely a foot high, round, stiff, generally forked and two-flowered. *Braçtes* at the division of the stalk, three, short, acute, withering. *Corolla* white, each segment of the limb streaked at the lower part with green. *Seeds* numerous, black. The analogy of the *Tigridia Pavonia* helps us to understand this root, which Cavanilles appears to have incorectly described.

MILLEFOLIUM, Millefoil or Yarrow, so denominated from *mille*, a thousand, in allusion to the multitude of divisions which compose its leaves. (See *ACHILLEA*.) The name is likewise, for the same reason, applied to an aquatic genus, called Water Millefoil. See *MYRIOPHYLLUM*.

MILLENARII, MILLENARIANS, in *Ecclesiastical History*, a sect among Christians, chiefly in the primitive church, who hold that Jesus Christ is to come again, and reign on earth for the space of a thousand years; during which time, the faithful are to enjoy all manner of temporal blessings; and at the expiration of this term, the day of judgment is to take place.

The Millenarii are also called *Chilists*, *Chilistæ*, from the Greek *χίλις*, *mille*, a thousand.

This opinion of the Millenarii is very ancient, and may be traced back almost as far as the time of the apostles. It had its origin from a passage in the Apocalypse too literally understood, in which mention is made of Christ's reign on earth, &c.

The opinion of S. Papias, in the second century, to whom Eusebius ascribes the origin of this notion of a millennium, says M. Launois, touching the new kingdom of Jesus Christ on earth, after the resurrection, was held for near three centuries, before it was charged as erroneous; as appears from ecclesiastical history. It was allowed of, and followed, under various interpretations, by several of the greatest men among the primitive fathers, as Irenæus, Justin Martyr, Lactantius, Tertullian, &c. Papias, to whom this opinion is ascribed, is represented by Eusebius himself a very credulous person, and it is certain his authority deserves no implicit confidence. From the second dialogue of Justin Martyr with Trypho, we have evidence that the doctrine of the millennium had not in his time the universal reception which Mr. Gibbon the historian, with a view of serving his own purpose, has supposed. Many Christians of pure and pious principles rejected it. This appears from the testimony of Justin, in a passage which has been misunderstood by Mede and Tillotson in consequence of the substitution of *ε* for *ου*. See Thirlby's ed. of Justin, A.D. 1722, and Jebb's ed. A.D. 1719.

Towards the close of the second century, the credit of this opinion began to decline, principally through the influence and authority of Origen, who opposed it with the greatest warmth, because it was incompatible with some of his favourite sentiments.

Nepos, an Egyptian bishop, endeavoured to restore this opinion to its former credit, in a book written "against the Allegorists," for so he called, by way of contempt, the adversaries of the millenarian system. But Dionysius of Alexandria, a disciple of Origen, stopped the growing progress of this doctrine by his private discourse, and also by two learned and judicious dissertations concerning the "divine promises." Jerom is also said to have opposed this millenary reign of Christ. The ancient Millenarians generally held, according to the account of the learned Dr. Whitby, that the temple, or the city of Jerusalem, should be rebuilt, and that the land of Judea should be the habitation of those risen saints, who were to reign on earth a thousand years; that this resurrection was not to be confined to the martyrs only, but that all the just were then to rise and reign with Christ; and that this reign should also extend to the just who were found alive at this first resurrection; that Jesus Christ shall then come down from heaven, and be seen on earth, and there reign with his servants; and that they shall then fare deliciously, and enjoy the richest wines and most delicious fruits, build houses, plant vineyards, and eat the fruits of them, and propagate their species.

Dr. Whitby has clearly proved, that this opinion of the millennium was never generally received in the Christian church, and that there is no just ground to think it was derived from the apostles. Indeed, if we examine their writings critically and candidly, we shall find that they never predicted this event to others, nor cherished the expectation of it in themselves. The passages which seem to countenance this opinion are contradicted by others, which are altogether inconsistent with it; so that the apostles never entertained the delightful hope of seeing their master coming again into the world. It is evident that St. John, who survived all the other apostles, could not have had any such expectation; since in the book of the Revelation the future events of the Christian church, which were not to take place,

many of them, till a long period of years after his death, and some of which have not yet been accomplished, are there minutely described. St. Peter likewise strongly intimates, that the day of the Lord might be said to be at hand, though it was at the distance of a thousand years, or more. St. Paul, in his second epistle to the Thessalonians, labours to remove the erroneous opinion that had been adopted by some, who expected the speedy coming of Christ; he describes a great corruption of the Christian church, which was to happen before the day of the Lord, and this appears by the express language of his prophecy to comprehend circumstances, which did not occur till many ages after they were predicted. But allowing, says bishop Watson, that the apostles did expect that Christ would come in their own time, their mistake in this respect ought not in anywise to diminish their authority as preachers of the gospel. They might be proper witnesses of the life and resurrection of Christ, though they were not acquainted with every thing which might have been known, though, in particular, they were ignorant of the precise time when our Lord would come to judge the world. It can be no impeachment, either of their integrity as men, or their ability as historians, or their honesty as preachers of the gospel, that they were unacquainted with what had never been revealed to them; that they followed their own understandings, where they had no better light to guide them; speaking from conjecture, when they could not speak from certainty; of themselves, when they had no commandment of the Lord. There is therefore no ground for the reflections of Mr. Gibbon, tending to invalidate the truth of Christianity and the doctrine of a future state, and founded on what he conceives to have been the opinion of the apostles and of ancient Christian writers, concerning the millennium. Watson's Apology for Christianity.

The millennium, according to the learned commentator Dr. Whitby, is a glorious state of the church, commencing after the fall of antichrist; and the subsequent conversion of the Jews to the Christian faith, in which it shall flourish in peace and plenty, in righteousness and holiness, and in a pious offspring, for a thousand years, under the undisturbed, though not personal government of Christ, over both Jews and Gentiles, which shall then be united into one church.

MILLENBACH, or MILBACH, in *Geography*, a town of Transylvania; 20 miles W. of Hermanstadt. N. lat. 46° 6'. E. long. 23° 14'.

MILLENNIUM, compounded of *mille*, a thousand, and *annus*, a year, a term literally signifying a thousand years; chiefly used for the time of our Saviour's expected second appearance, and reign on earth.

Mr. Whiston, in several of his writings, has endeavoured to support the notion of a millennium. According to his computation it was to have commenced about the year 1720. See MILLENARIUM.

MILLEPEDA, in *Conchology*, the name given by authors to a species of *Strombus*; which see.

MILLEPEDES, or SLATERS, in *Zoology*, well known insects, formerly used on many occasions in medicine. This insect is otherwise called *asellus*, being a species of *oniscus*, in English the *wood-louse*. (See ASELLUS and ONISCUS.) Mr. Ray describes seven different species of this insect, some of which we see every day, others are more rare. The blue kind, which rolls itself up into a ball, is the proper medicinal kind; though there is another sort of a pale brownish-grey, smaller, flatter, and thinner than the former, and having the last division of the body not annular but pointed, and a forked tail, which is of the same quality. They are

found in cellars, on roofs of houses, old walls, and under stones and logs of wood in cold moist places. They are rather more than half an inch in length, whitish on the belly, with seven pairs of legs, each terminated by a sharp horny claw. The head is somewhat pyramidal, and furnished with two articulated feelers; and the upper part is guarded by a callous, brownish, livid-coloured, jointed armour, consisting of 14 semicircular plates, within which the insect rolls itself like a ball when touched; like some other insects it casts the skin, and carries the young in valvular follicles under the abdomen.

Millepedes are so generally known among the vulgar, that most persons seem to be masters of their medicinal uses, and take them in many cases without any other direction. They were formerly regarded as expectorant, diuretic, and absterfive, and occurred frequently in prescriptions for disorders in the kidneys, and also in obstructions of the viscera, and particularly in the jaundice; and in many other diseases. Although they are retained in the list of *Materia Medica*, the good sense of modern practitioners has nearly exploded the use of them.

The *millepedes preparatae* of the shops, when they were considered as a medicine of importance and beneficial efficacy, were reduced to powder, either by inclosing them in a thin canvas cloth, and suspending them over hot spirit of wine in a close vessel, till they were killed by the steam and rendered friable; or by including them in a proper vessel and drying them with a very gentle heat. The prepared millepedes, or slaters as they are called, have a fetid odour, and a sweetish nauseous taste.

There were also several chemical preparations of millepedes, as spirit, volatile salt, oil, and wine of millepedes.

The college of Edinburgh formerly directed two ounces of live millepedes to be slightly bruised, and digested for a night in a pint of Rhenish wine, after which the liquor is to be pressed through a strainer.

MILLEPORA, in *Natural History*, a genus of the class Vermes, and order Zoophyta. The animal is an hydra or polype; coral mostly branched, and covered with cylindrical turbinated pores. There are 34 species, chiefly inhabitants of the Mediterranean; but some are found on our own coasts, especially in Cornwall, and a few are scattered through the seas of America, India, and Polynesia.

Species.

ALCICORNIS. This species is branched, compressed, straight, with scattered and scarcely visible pores. It inhabits the Indian and American seas, and is frequently found incrusting pieces of rock, gorgonia, and cocoa-nuts; dull white with sometimes a yellowish tinge, smooth, solid, stony, sometimes brittle, with very minute pores.

CERULEA. This is flat, rough, divided into thick plates bending different ways, the tops of which are sometimes lobed, and both sides furnished with cylindrical substellate pores. It is found in vast masses in the Indian ocean; the laminæ or plates are generally half an inch thick, and full of minute pores between the star-like cells. It appears to be an intermediate species between the madreporæ and the milleporæ.

ASPERA. Somewhat compressed, with eminent pores, which are sometimes cleft. It inhabits the Mediterranean seas. It is erect, pointing two ways, roundish, with crowded pores at the branches, cleft on the lower side.

SOLIDA. Turbinate, with crowded angular pores. Found on the shores of Gothland. Tubes of pores with transverse divisions within.

TRUNCATA. Dichotomous, erect, with truncate branches.

MILLEPORA.

It inhabits the Mediterranean and North seas. Is of a yellowish-grey colour, and appearing as if covered with a coat of varnish, very brittle, within greyish, the branches are divaricate, the pores are placed in a quincunx order.

MINIACRA. Very minute, branching into small lobes, and covered with small pores. This species is found in the Mediterranean and Indian seas. It is a beautiful little coral, and the smallest of its genus, being seldom above a quarter of an inch high; the whole surface, when magnified, appears full of minute, white, blind spiracles, and on the tops of the lobes are several scattered holes surmounted with a margin; the base is broad, and with this it adheres to shells, rocks, and other corals.

* **CERVICORNIS.** This is a little compressed, dichotomous, with cells on both sides, tubular, and prominent forests. It inhabits the Mediterranean and Cornish coasts; is from five to six inches high; is of reddish or yellowish-brown, within whitish, branched like the horns of a stag, and appearing as if covered with a varnish; a few of the pores are divided at the base, which are narrow, and of a brittle texture.

* **SKENEL.** Compressed, and slightly branched, with cells on both sides, disposed in alternate rows; cells turbinate, with a gaping mouth and covered with a helmet, the under lip furnished with a small tooth. It is found near Aberdeen, adhering to the rocks; of a bright shining white colour, and appearing as if covered with silver varnish.

PUMILA. This is depressed, with scattered irregular retuse branches every where porous and roughish. It inhabits the Mediterranean, on shells and rocks; is about three inches high, solid, and very much branched, pale grey, and within whitish.

COMPRESSA. This species is furnished with a stem slightly branched, and a little compressed, branches distant, pores every where a little prominent and rough. It inhabits the Mediterranean.

* **LICHENOIDES.** Caulicent, decumbent, with waved nearly opposite denticulate branches; pores a little prominent on the upper side, and striate beneath. It inhabits the Mediterranean and European coasts, on stones and other marine substances; milk-white, very brittle, and about two inches long.

VIOLACEA. Flat, branching, with erect flexuous round branches, a little compressed, with a porous suture encompassing the margin. It inhabits the South-sea islands; is about three inches high; fine violet blue, with two rows of small pores each side the margin, besides the line of larger ones surrounding it; the surface is rough with a few clusters of little studs.

TUBULIFERA. This species is solid, branched, with tubular scattered pores; the branches are confluent, with tapering rough extremities. It inhabits the Sicilian seas; is about four inches high, white, solid; the trunk and branches smooth.

* **FASCIALIS.** Membranaceous, flat, narrow, branched, flexuous, with pores on both sides. It is found on the coast of the Isle of Wight, as well as in the Mediterranean, and grows in irregular masses; the branches are flat, narrow, and irregularly subdivided, which coalesce, twist, and branch out again, leaving hollow spaces between them. It is about six inches in diameter.

* **FOLIACEA.** This is, as its name imports, foliaceous, flexuous, uniting sometimes at the extremities, and is covered with pores on both surfaces, so small as to be scarcely visible. Found growing to an oyster-shell at the Isle of Wight; is from three to twelve inches long, white and stony.

ZRYLANICA. This is composed of thin concrescent irregularly divided membranes, with rows of oblong cells on each side. It is of a white colour, and is found in the Indian ocean.

FORNICULOSA. Crustaceous, with rows of vaulted cells furnished with a small ringent lip, and closed by a membrane. Is found in South America, adhering to other corallines; resembles the *Phylira foliacea*, and is thought by some to be a cedeopore.

CRISTULENTA. Crustaceous, somewhat branching, and irregularly shaped, with rows of oblong cells closed by a membrane, and very entire divisions. It inhabits the salt dykes of Holland, and the Atlantic; is of a greyish-white colour, and forming sub-globular masses.

EUSIA. This also is crustaceous, with open cells pectinate at the lateral margin. It is found in the American ocean, affixed to rocks; the cells have erect subulate teeth, about four on each side.

RETICULATA. Membranaceous, with depressed linear branches rough on the upper surface, with prominent pores. It inhabits the Mediterranean and West Indies; is white, brittle, horizontal, convolute, and much branched; the reticulate branches growing in an undulate manner, and coalescing occasionally; the upper surface is rough, with pointed pores, the under surface is striate.

* **CELLULOSA.** Membranaceous, reticulate, funnel-formed, irregularly waved, and plaited at the margin, with numerous pores on one side. It is found in the Mediterranean and European seas, fixed to marine substances, and resembles a piece of lace, consisting of a flat erect undulated membrane covered with large regular perforations, sometimes disposed in a cup-shaped form, at other times running into loose folds with a waved margin like a ruffle; is about three inches high, solid, brittle, white or yellowish-grey, with very vivacious polypes.

CLATHRATA. Umbilicate, reticulate, with flat branches that are porous on one surface. It inhabits the Indian ocean, and is thought to be an intermediate species between the *Cellulosa* and *Lichenoides*; it is white and seated on a solid centre.

RETICULUM. Composed of branched cancellate threads. It is found in the Mediterranean, covering the surface of shells and the roots of fuci; resembles a spider's web, and is composed of fine capillary threads.

SPONGITES. Caulicent, erect, with angular imbricate branches; it resembles a sponge; is about a foot long; the pores are not visible.

CORIACEA. Sub-membranaceous, semi-orbicular, and nearly horizontal, with a few pores on the lower surface. It inhabits the Atlantic and Numidian seas, covering the stems of the *Fucus cartilagineus*, and forming covers for the chambers of other corals.

CALCAREA. Branched, milk-white, solid, with tapering sub-divisions. It inhabits the Mediterranean; is four inches high. The branches grow smaller towards the end, and are usually regularly sub-divided.

* **POLYMORPHA.** Crustaceous, solid, irregularly shaped, but generally branched and tuberculate, and without visible pores. This is found in most of the European seas, and is the common coral of the shops: in many places it grows in such abundance, that it is burnt for manure; its colour is either red, yellowish, or greenish, and is but seldom white! It was formerly much used in medicine as an absorbent. It is sometimes shaped like the kernel of a walnut, often in large compressed masses, sometimes like a small bunch of grapes, but most frequently in short and rather irregular

ramifications of a chalky tuberculate appearance, and stony substance.

DECUSSATA. Composed of cretaceous erect laminæ, or plates, crossing one another, and uniting differently in different places. It is found on the coast of Portugal, in masses about five or six inches wide.

* **ALGA.** This consists of thin semicircular plates, disposed horizontally: it inhabits the Cornish coast, adhering to and frequently entirely covering the Polymorpha, and is either red, purplish, yellow, or whitish; extremely thin and brittle, with semicircular plates of various sizes, constantly growing horizontally, with their margins bending over, rendering them convex on the upper side, and concave beneath.

* **PUMICOSA.** Irregularly shaped, brittle, rough, and composed of sharp-pointed roundish cells. It inhabits the British coasts, and is frequently found incrusting many of the Sertularia in small irregular masses, appearing very like white sand strongly united together; the branches are generally cylindrical, each about half an inch long; the cells are placed round about in alternate order, shaped like an helmet just opening, with a hole in the middle.

* **TUBULOSA.** This is a parasitic plant, crustaceous, pale purple, with small tubular cells disposed in transverse rows or whorls. It inhabits the Mediterranean and British coasts, and is found frequently encompassing the stem of the Sertularia falcata.

PINNATA. Dichotomous, erect, with tubular pores disposed in a pinnate order. Inhabits the Mediterranean: when fresh caught it is greyish, though sometimes green, is about an inch high, and very brittle.

* **LILIACEA.** Creeping prostrate, in obtuse linear divisions, with tubular pores on the upper surface disposed in transverse rows. It inhabits the Mediterranean and Cornish coasts, and resembles, in some respects, the Tubulosa, but is white.

CARDUNCULUS. This is irregularly shaped, membranaceous, with concentric wrinkles, and central triangular pyramidal tubes. It is found in the Mediterranean, adhering to the Sertularia; it is minute, white, sub-pellucid, and resembling the flower of a thistle.

MILLER, PHILIP, in *Biography*, a celebrated gardener and botanist, was born in 1691. His father had the superintendance of the Physic Garden at Chelsea, belonging to the Apothecaries' Company, and founded by sir Hans Sloane; to which appointment he himself succeeded in the year 1722. In this situation he became distinguished by his practical knowledge of plants, and especially by his skill in their cultivation. The latter was evinced in a paper, communicated by himself to the Royal Society in 1728, and printed in the 35th volume of the Philosophical Transactions, on "a method of raising some exotic seeds," which had been judged almost impossible to be raised in England. This consisted in allowing them to germinate in a bark bed, previously to their being planted in earth. By this means alone, several hard-shelled nuts can be made to vegetate in our stoves; and indeed the practice is founded on a judicious observation of nature's operations. Two years afterwards, Mr. Miller made known, for the first time, the present popular mode of causing bulbous plants to flower in water.

In 1730 he published anonymously a thin folio, accompanied with twenty-one coloured plates, after the drawings of Van Huysum, entitled "A Catalogue of trees, shrubs, plants, and flowers, both exotic and domestic, which are prepared for sale in the gardens near London." The preface is signed by a society of gardeners, amongst whom the name of Miller appears. The work is much more than a mere catalogue, the generic characters being given in

English, and many horticultural and economical remarks subjoined. Most of the plates contain figures of several different plants. This publication is mentioned by Haller, who was uninformed respecting its real author, in his *Bibl. Bot.* v. 2. 229.

In 1731 appeared the first edition of the "Gardener's Dictionary," in folio, the most celebrated work of its kind, which has been translated, copied and abridged, at various times, and may be said to have laid the foundation of all the horticultural taste and knowledge in Europe. It went through eight editions in England, during the life of the author, the last being dated 1768. This forms a very thick folio volume, and follows the nomenclature and style of Linnæus; the earlier ones having been written on Tournefortian principles. A much more ample edition has been published within a few years, making four large volumes, under the care of the Rev. Prof. Martyn. In this all the modern botanical discoveries are incorporated with the substance of the 8th edition. Linnæus has justly remarked, that Miller's was a botanical as well as a horticultural dictionary. We cannot but think that it has proved a powerful means of introducing a taste for scientific botany, amongst those who at first had recourse to it merely as cultivators.

This work had been preceded, in 1724, by an octavo of two volumes, called "The Gardener's and Florist's Dictionary," and was soon followed by "The Gardener's Kalender," a single octavo volume, which has gone through numerous editions. One of these, in 1761, was first accompanied by "a short introduction to a knowledge of the Science of Botany," with five plates, illustrative of the Linnæan system. Miller had been trained in the schools of Tournefort and of Ray, and had been personally acquainted with the great English naturalist, of which he was always very proud. No wonder therefore if he proved slow in submitting to the Linnæan reformation and revolution, especially as sir Hans Sloane, the Mecænas of Chelsea, had not given them the sanction of his approbation. At length more intelligent advisers, Dr. Watson and Mr. Hudson, overcame his reluctance, and, his eyes being once opened, he was no longer behind-hand in deriving advantage from so rich a source. He became a correspondent of Linnæus, and one of his warmest admirers. Although it does not appear that he had any direct communication with Micheli, he was chosen a member of the Botanical Society of Florence, which seems to indicate that they were known to each other, and probably communicated through Sloane and Sherard, as neither was acquainted with the other's language. Miller maintained an extensive communication of seeds with all parts of the world. His friend Houston sent him many rarities from the West Indies, and Miller but too soon inherited the papers of this ingenious man, amongst which were some botanical engravings on copper. Of these he sent an impression to Linnæus; and such of them as escaped accidents, afterwards composed the *Reliquiæ Houstonianæ*. See **HOUSTONIA**.

In 1755 our author began to publish, in folio numbers, his "Figures of Plants," adapted to his dictionary. These extended to three hundred coloured plates, making, with descriptions and remarks, two folio volumes, and were completed in 1760. They comprehend many rare and beautiful species, there exhibited for the first time. The commendable design of the writer was to give one or more of the species of each known genus, all from living plants; which as far as possible he accomplished. His plates have more botanical dissections than any that had previously appeared in this country.

Miller was a fellow of the Royal Society, and enriched its Transactions

Transactions with several papers. The most numerous of these were catalogues of the annual collections of fifty plants, which were required to be sent to that learned body, from Chelsea garden, by the rules of its foundation. These collections are preserved in the British Museum, and are occasionally resorted to for critical enquiries in botany. He wrote also on the Poison Ash, or *Toxicodendrum*, of America, which he believed to be the Japanese Varnish tree of Kämpfer; a position controverted by Mr. Ellis. (See ELLIS.) The latter appears to have been most in the right, which may account for a certain degree of ill humour betrayed by Mr. Miller in the course of the dispute. It is scarcely consistent with the usual candour of the amiable Dr. Pulteney, that in his "Sketches of the Progress of Botany in England," he rather discovers a partiality to Miller on this subject. We cannot account for his omitting all account of so great a man as Ellis, in that valuable work.

Miller continued to attend to his duties and his favourite pursuits to an advanced age, but was obliged at length, by his infirmities, to resign the charge of the garden. He died soon after, at Chelsea, December 18, 1771, in his 81st year, and was interred in the burying-ground in the King's road, with his wife, by whom he had, if we mistake not, several children. One of them, Mr. Charles Miller, spent some time in the East Indies, where he acquired a handsome fortune, and is, we believe, now living in England. This gentleman made some experiments on the cultivation of wheat, an account of which was given by Dr. Watson to the Royal Society. They were intended to shew the wonderful produce to be obtained by division and transplantation, and have often been repeated. An account of the island of Sumatra, by Mr. C. Miller, is printed in vol. 68th of the Philosophical Transactions. The sister of Philip Miller married Ehret, and left one son. See EHRETIA.

In the course of his residence at Chelsea, Miller collected, principally from the garden, an ample herbarium, which was purchased by Sir Joseph Banks. He sent many dried specimens to Linnæus. Pulteney's Sketches. Haller Bibl. Bot. Works of Miller. Dryandr. Bibl. Baekes.

MILLER, JAMES, an English dramatic writer, was born in the year 1703. He was designed for business, and received an education suitable to it, but feeling a repugnance to that sort of employment he went to Wadham college, Oxford, and having completed the usual course he took orders. While at the university he wrote a famous comedy, entitled "The Humours of Oxford," which was performed in 1729. He was author of several other pieces, of which the last was a tragedy, entitled "Mahomet." This had a considerable run, and before its popularity was at all abated, the author died in 1743. He published a volume of sermons, and poems. Biog. Dram.

MILLER, Lady, an accomplished woman, of some literary talents, who published letters from Italy, six vols. 8vo. She resided at Bath-Eaton, near Bath, where she entertained several ingenious persons, who composed a collection of poems, which was afterwards published. She died in 1781.

MILLER, an admirable performer on the bassoon, who flourished in the middle of the last century. The concertos which he performed during many years, at Vauxhall, Hickford's Room, the Swan, Castle, and King's Arms concerts, and the solo parts allotted him by Handel in his oratorios and concertos, always excited attention, were heard with delight, and justly applauded for the sweetness of his tone, and neatness of his execution.

MILLER'S, in *Geography*, a settlement in Kentucky, on a branch of Licking river; 32 miles N.E. of Lexington.

MILLER'S Bay, a bay on the S. coast of Jamaica, N. of Portland Point.

MILLER'S Town, a town of Northampton county, in Pennsylvania, pleasantly situated on a branch of Little Lehigh river; 47 miles N.W. by N. of Philadelphia; containing about 40 houses.—Also, a town in Shenandoah county, in Virginia; 32 miles S. of Winchester.

MILLER'S Thumb, in *Ichthyology*, an English name for the fish called also the bull head, and by authors the cottus; being the *COTTUS gobio* of Linnæus; which see.

MILLERIA, in *Botany*, received its name from Dr. Houston, and was first published by Prof. Martyn, sen., in honour of their common friend, the celebrated curator of Chelsea garden. (See MILLER.) Linnæus, in adopting the name, observes, *Crit. Bot.* 80, that "this American plant, whose close-shut calyx entirely surrounds and protects its one or two seeds, is well bestowed on a man who spared no pains in procuring rare American seeds, and in contrivances for preserving and communicating them."—Linn Gen. 443. Schreb. 579. Willd. Sp. Pl. v. 3. 2328. Mart. Mill Dict. v. 3. Aut. Hort. Kew. ed. 1. v. 3. 266. Juss. 187. Lamarck Illustr. t. 710. Gärtn. t. 168. Hoult. Ic. ined. f. 13. (Randia; *ibid.* f. 14.)—Class and order, *Syngenesia Polygamia-necessaria*. Nat. Ord. *Compositæ oppositifoliae*; Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* of one leaf, very large, in three deep segments, closed together in a flattish-triangular form, permanent; the two *innermost* equal, nearly ovate, acute, flat; the *outer* one twice as large, roundish, pointed, flat, heart-shaped at the base, most deeply separated. *Cor.* compound, half radiant: *united florets* two, within the smaller segments of the calyx: *female* solitary, within the larger one: the former of one tubular, erect, five-toothed petal: the latter ligulate, erect, obtuse, concave, with one or two notches. *Stam.* (in the united florets) Filaments five, capillary; anthers as many, erect, linear, connected laterally by the middle, acute, as long as the corolla. *Pist.* (in the same) Germen oblong, very thin; style thread-shaped, the length of the petal; stigmas two, linear, weak, obtuse, spreading: (in the female floret) Germen large, triangular; style thread-shaped, the length of the petal; stigmas two, brittle-shaped, long, reflexed. *Peric.* none, except the closed common calyx, become coriaceous and coloured. *Seed* to the united florets none: in the female ones solitary, oblong, obtuse, triangular, tapering downward. *Down* none. *Receptacle* very minute, naked.

Obf. *M. quinqueflora* has the female floret three-cleft; the united ones four in number; calyx accompanied by five membranous internal leaves; style simple in the united florets, cloven in the female.

Ess. Ch. Receptacle naked. Down none. Common Calyx of three permanent valves. Corolla semi-radiant.

1. *M. quinqueflora*. Five-flowered *Milleria*. Linn. Sp. Pl. 1301. Mant. 478. (*M. dichotoma*; Cavan. Ic. v. 1. 58. t. 82. *M. annua erecta, foliis conjugatis, floribus spicatis luteis*; Mart. Decad. 41. t. 41.)

2. *M. maculata*. Mill. Dict. ed. 8. n. 2. (*M. annua erecta ramosior, foliis maculatis, profundius ferratis*; Mart. Decad. 47. t. 47. f. 2.)

Leaves heart-shaped. Flower-stalks forked. Calyx double.—Native of Vera Cruz, Panama and Mexico. Sent to Chelsea garden in 1731 by Houston, but now lost, having no beauty to secure the attention of cultivators in general. Linnæus had it at Upsal, and Cavanilles at Madrid. This is an annual stove plant, flowering in autumn. *Stem* five or six feet high, square, branched, leafy. *Leaves* opposite, stalked, heart-shaped, broad, ribbed, roughish, slightly toothed

toothed or serrated, tapering at the base. *Flowers* small, yellow, in terminal, leafy, slender, forked panicles. The *leaves* of the variety β are more strongly serrated, of a darker green, and blotched with black. The number of *florets* varies.

2. *M. biflora*. Two-flowered *Milleria*. Linn. Sp. Pl. 1301. Hort. Cliff. t. 25. (*M. annua erecta minor, foliis parietaria, floribus ex foliorum alis*; Mart. Decad. 47. t. 47. f. 1.)—*Leaves* ovate. Flower-stalks simple, terminal, aggregate. Calyx single.—Native of the country near Campeachy, from whence it was sent by Houlton in 1730.—Rather smaller, and less showy than even the former. The *leaves* are ovate and triple-ribbed. *Flowers* pale yellow, very small, in terminal tufts.

Willdenow's *M. Contrayerba*, n. 3. Cavan. Ic. v. 1, 2. t. 4, is our *Flaveria capitata* (see FLAVERIA); and his *angustifolia*, n. 4. Cavan. Ic. v. 3. 12. t. 223, is of the same genus. Perhaps *Flaveria* ought to be sunk in *Milleria*, Cavanilles having found a radiant floret. Their habits however are not similar. S.

MILLE-ROCHES, ISLE AU, in *Geography*, a small island of Upper Canada, in the river St. Laurence, containing from 6 to 700 acres of good soil. N. lat. $45^{\circ} 5'$. W. long. $75^{\circ} 40'$.

MILLEROLLE, in *Commerce*, an oil measure at Marseilles = 4 escandaux = 64 Paris pintes, or $15\frac{3}{4}$ English gallons nearly, and weighing about 136 poids de table, or 122lb. avoirdupois. The wine measure of the same denomination is = 4 escandaux = 60 pots; and 4 millerolles of wine = 63 English gallons nearly; and $3\frac{1}{2}$ millerolles are reckoned = a Bourdeaux hoghead.

MILLERS, or PAYQUAGB, in *Geography*, a river of the Massachusetts, which runs W. by S. and falls into Connecticut river, between Northfield and Montague.

MILLERY, a town of France, in the department of the Rhone and Loire; seven miles S. of Lyons.

MILLES, JEREMIAH, in *Biography*, a learned divine and antiquary, was born at High Cleer, in Hampshire, in 1713, of which place his father was minister. He succeeded Dr. Lyttleton as dean of Exeter, and also as president of the Society of Antiquaries, to whose *Archæologia* he was a great contributor. Dr. Milles was a zealous champion for the genuineness of the Rowley poems, of which he printed an edition in 4to., with glossarial annotations. This work laid him open to the attacks of the critics, who were sceptical on these supposed relics of antiquity. The dean died in 1784.

MILLESSOW, in *Geography*, a mountain of Bohemia, in the circle of Leitmeritz.

MILLET, in *Botany*. See MILIUM.

MILLET, the common name of a plant which grows naturally in India, whence it was first imported into Europe. It is greatly cultivated in Italy, Spain, and the southern parts of France, for the food of men as well as that of poultry. It may also be raised in this climate. This is a plant that delights in a light sandy soil, prepared in the same manner as for maize; and in each land it branches out into many stalks, sometimes thirty or forty, not unlike reeds either in their shape or leaves, of which there is one at each joint. The top of each stalk is terminated by a large, loose panicle, which hangs on one side, with a chaffy flower, which is succeeded by a small round seed, about the bigness of turnip or cabbage seed, of a yellowish-white colour in one variety, and of a dark red inclining to black in another, which are the small millet, and the large, a distinction which some make, as only varieties of the same species. It is likewise said to thrive extremely well in strong land; but will

not do in stony ground, or where the bottom is of either a chalky or clayey nature.

Miller advises, that it should be sown in the beginning of April, that it may ripen in August; but in warmer climates, the general rule is to sow it either between the middle and the end of May, or about Midsummer. The former crop is reaped at the end of September, and the latter about the end of October. The seed is usually sown in furrows, very thin, and covered with the plough or rake. The largest sort should be sown thinnest, because it branches most. When the plants are about a month old, the ground should be stirred round them with a hand-hoe, as well to lay fresh earth to their roots, as they require much nourishment, as to clear them from weeds, which they afterwards prevent by over-topping them. At the same time, the millet plants should be thinned out wherever they grow too close, so as to leave, in general, about six inches between each plant. Nothing more is necessary to be done till harvest, except that, when it begins to ripen, great care must be taken to protect it from birds, which would otherwise soon devour it. The returns of this crop are very great; it is not easily hurt by drought or rain, nor is it subject to blight. Frequent showers of rain are of great service to it whilst in its young growth.

As soon as the crops are ripe, the panicles of the plants are cut off near the uppermost joints of the stalks with a knife, and put into baskets or sacks, in which they are carried home, when they are then laid up in heaps covered with old cloths, and after remaining in that situation five or six days, spread upon the barn floor, threshed out with a flail, and cleansed like other sorts of grain. Great care must be taken to dry it well in the sun, before it is laid up in the granary; as it soon spoils if the least moisture be left in it; being of all grains the most difficult to keep, unless it be thoroughly dry; but on the other hand, none keeps longer, or better, after it has been well dried. It is not liable to the weevil; but it should be turned from time to time in the granary. It has been constantly found that the late sown crops are the most defective, and that their panicles are smaller than those of the same grain sown at an earlier period.

But the small white millet is the most delicate, and the best for puddings, &c. The red is larger and coarser, and used for pigeons, poultry, and swine, after being ground to meal; it is very good fodder for cattle, either green or after its grain is threshed out. From its numerous roots, large size, and quick growth, it is a sort of crop that exhausts the soil greatly, and of course must be well guarded against in that respect.

The common millet was originally brought from the eastern countries, where it is still greatly cultivated: from whence we are furnished annually with this grain, which is by many persons greatly esteemed for puddings, &c. This is seldom cultivated in England, but as a curiosity in small gardens, or for poultry, as its seeds generally ripen well.

Millet is reckoned by Pliny the most fertile of all grain; one grain of it producing three Roman sextaries.

Millet is cooling, drying, and binding, somewhat windy, and not easily digested; a strong decoction of it with figs and raisins, mixed with wine, and drank warm in bed, is a very good sudorific, though it is seldom used.

Millet, by consent of authors both ancient and modern, is refrigerating and drying; it is of bad juice, difficult of digestion, binds the belly, and generates flatulencies; it is however well known to be a very grateful food to many nations at present. In former times it served to make bread, under a dearth of better corn, as we are assured by Dioscorides,

corides, Pliny, Galen, and others of the ancients. Among the Italians, says C. Boehne, leaves are made of millet, which are yellow, and eaten hot by many, not out of necessity, but for their sweetness; but when this bread is grown hard, it is quite black. Of the flour of millet and milk, the Italians make fine cakes, which must be eaten as soon as dressed, or else they become glutinous, and ungrateful to the taste.

A pudding prepared of millet, boiled in milk, with an addition of butter, and sugar sprinkled over it, is much in request among the Germans at present; and these puddings have been long ago introduced into England, and are still in fashion.

The flour of millet was formerly used in fomentations, for the gripes, and for pains of the head and nerves; it was applied externally in bags, because the use of it in cataplasms was difficult, on account of its friability. If the membrane of the brain happens to be wounded, it is excellently coagulated, says Aëchigenes, by infusing thereon the juice of calaminth, and sprinkling it with dry flour of millet. A decoction of millet, with figs and raisins, is called, by Heurnius, a noble sudorific and diuretic. Or, take of a decoction of millet, boiled till it bursts, four ounces; white wine, two ounces: let the patient take it hot. Chesneau.

Millet is diuretic and astringent; the seeds are of extraordinary service in diseases of the lungs, and exulcerations of the kidneys: made into a cataplasin, they are anodyne and resolvent. Hist. Plant. adscript. Boerhaave.

MILLET, *Indica*. See HOLCUS.

MILLEVANT, in *Geography*, a town of Prussia, in the province of Pomerelia; 16 miles S. S. E. of Dantzic.

MILLEVILLE, ALESSANDRO, in *Biography*, an excellent organist, born at Ferrara, much celebrated in Italy at the beginning of the seventeenth century. He was successively patronized by the king of Poland, the emperor of Germany, and the duke of Ferrara. He was also a voluminous composer, as appears by all the catalogues of the time; in which we find the following list of his works: Messe e Salmi a 3 voci. Concerti a 2, 3, & 4 voci, libro 1. Motetti a 3, 4, 5, & 6 voci, libro 7mo. Novelli fiori a 2 & 3 voci, libro 6. Litanie di B. V. a 3 voci: and, lastly, he published at Venice, 1622, a work intitled "Gemme Sacre," and in the same city, 1629, another book of motets. Walther.

MILLEVILLE, in *Geography*, a town of Sweden, in the province of Warmeland; 25 miles S. of Carlstadt.

MILLIARE, or MILLIARIUM, among the Romans, denoted a *mile*, consisting of a thousand paces, *mille passus*; whence the name.

In the Roman empire, the milliaria, in all the great roads, were marked with stones, or columns erected for that purpose; commencing from a column in the heart of the city, called *milliare aureum*.

Those columns were also hence denominated *milliary columns*.

MILLIARIA CANTONS. See CANTONS *Equitata*.

MILLICO, GIUSEPPE, of Naples, in *Biography*, arrived in England 1772, from Vienna, where he had acquired great applause as a singer and actor, in Gluck's operas of "Orfeo," "Alceste," and "Paride ed Elena," and as a singing master, by making Gluck's niece one of the most expressive singers then alive.

This judicious performer and worthy man, who was not an Adonis in person, and whose voice had received its greatest beauties from art, found the musical part of our nation in no favourable disposition towards him. The admirers of Tenducci and Guadagni, as well as the Cocchi, Guglielmi, Giardini, Vento, and Bach parties, however hostile in other

particulars, all agreed in decriing every part of that opera in which their favourite had no concern. Sacchini, who arrived here soon after, was involved in these cahals. None of the friends of their predecessors would allow that Millico could sing or the new master compose. Violent and virulent means were used to prison, or at least to shut the ears of the unprejudiced public; but not with much success. Indeed, at first both the music and performance were frequently hissed; but, at length, Sacchini's compositions were generally allowed to be admirable, and Millico's importance was manifested by a crowded house at his benefit, composed of the first persons for taste and rank in the kingdom; and at the end of the next season, several who had boldly pronounced that neither Sacchini could compose nor Millico sing, would have given a hundred pounds if they could have recalled their words, or made their acquaintance forget they had been guilty of such manifest injustice and absurdity.

The cauzonets of his composition, in singing which he used to accompany himself on a small harp slung over his shoulder, are still as *muscadei camera*, elegant and pleasing. Not many years after he left this country, where he remained two seasons, he was afflicted with blindness; but being received in the chapel royal at Naples, he performed in that melancholy state a considerable time, till other infirmities came on, when he threw himself into a convent to end his days. He was living when the French invaded Naples; but whether the turbulence of the times suffered him to live or die in peace, we are unable to affirm.

MILLIGRAMME, in *Commerce*, a French measure of weight = .0154 English grains. See WEIGHT.

MILLILITRE, a French measure of capacity = .06103 English cubic inches. See MEASURE.

MILLIMETRE, a French measure of length = .03937 English inches. See MEASURE.

MILLING, in the *Manufactories*, an operation called also *fulling*.

MILLING, or *throwing of silk*, is the last preparation of silk before dyeing; serving to twill it, more or less, according to the work for which it is intended.

To prepare the silk for milling, they first put it in boiling water, inclosed between two linen cloths. The mill is a square machine, composed of several pieces of wood, mortised in each other, so as to form a kind of large cage, in the centre of which are two wheels placed parallel over each other, whose axis bears on two posts. When the machine is simple, a single man turns these wheels by means of a little cog, in which they catch, and a large handle.

The wheels, put in motion by the handle, communicate their motion to eight windles, or reels, or even more, according to the largeness of the machine; on the flights or arms of which the silk is wound from off two rows of bobbins placed on each side of the machine; each row at the height of one of the two wheels in the centre. These bobbins have their motion by means of leathern thongs, which bear on little cylinders of wood that support them, and turn at length on the two wheels at the centre; so that the silk on each bobbin twirls as it winds, and forms its separate skin.

The smallest wheel moves two hundred of these bobbins, over which a single person is sufficient to inspect, to put new bobbins or spoils in lieu of those discharged of their silk, and to knot the ends when they break. See WINDING of *Silk*.

MILLINGTONIA, in *Botany*, a supposed new genus, consecrated by the younger Linnæus, to the memory of sir

Thomas

Thomas Millington, Savilian professor at Oxford, who is recorded by Grew to have first suggested to him that the anthers of plants were their male organs.—Linn. Suppl. 45. Schreb. 425. Willd. Sp. Pl. v. 3. 382. (where the name is thrice written *Mallingtonia*, by mere inattention.) Juss. 138. Class and order, *Didymia Angiospermia*. Nat. Ord. *Personate*, Linn. *Bignoniæ*, Juss.

The fruit being unknown, the generic character in the *Supplementum* has always been incomplete, and is now found insufficient to distinguish the plant in question from *Bignonia*, to which genus it is referred by Dr. Roxburgh.

Bignonia suberosa. Roxb. Coromand. v. 3. 11. t. 214. (*Millingtonia hortensis*; Linn. Suppl. 291.)—Koenig first observed this fine tree in the gardens of the Rajah at Tanschuur, or Tanjore, but did not meet with the fruit. His manuscript however does not imply that none is ever produced there. From hence some plants were brought to Madras, and one to Calcutta, where Dr. Roxburgh informs us it is now an elegant tree, about thirty feet in height, blossoming at the close of the rainy season, and ripening seeds in March. The *trunk* is straight, with a light ash-coloured, deeply cracked, spongy bark. *Leaves* opposite, repeatedly pinnate, about two feet long; leaflets ovate, pointed, smooth, serrated in Roxburgh's figure, but in his description, like the Linnæan specimens, entire, and conveying some idea of the foliage of Catalonian Jasmine. *Panicles* terminal, large, cross-branched, many-flowered, smooth. *Flowers* two inches long, tubular, slender, white, delightfully fragrant; their upper lip erect, cloven half-way down; lower in three equal, ovate, three-ribbed, reflexed segments. *Pod* a foot long, not an inch broad, compressed, nearly smooth, pointed at each end. *Seeds* winged.—The native country of this plant has not yet been ascertained.

MILLINGTONIA is now applied as the name of a new East India genus in *Diadelpbia Decandria*, by Mr. Donn in *Hort. Cant.* ed. 5. 180. Of this we presume Mr. Brown to be the author, and that it will be defined in the new edition of Mr. Aiton's *Hortus Kevenfis*. Three species are enumerated by Mr. Donn, *M. trinervia*, *striata*, and *semialata*; all stove shrubs, which seem not yet to have flowered at Cambridge. This genus is placed between *Hedysarum* and *Indigofera*.

MILLION, in *Arithmetic*, the number of ten hundred thousand; or a thousand times a thousand.

A million of gold, or million of money, is sometimes understood of a million of pounds; and sometimes of a million of crowns.

MILLION *Bank*. See *BANK*.

MILLMOTH, in *Natural History*, the name of an insect approaching to the nature of the beetle, but having no sheath wings. It is common in the abode of millers and bakers, and other persons who deal in meal.

MILLOT, CLAUDE-FRANÇOIS-XAVIER, in *Biography*, a well-known French writer, was born at Befançon in 1726. He was brought up among the Jesuits, and devoted himself to the duties of the pulpit; but when the period for public exertion arrived, either the weakness of his voice, or a natural timidity, convinced him that he could not make progress as a public orator. He, therefore, undertook a professorship of history at Parma, by the recommendation of the prince. He filled this office with high reputation, and upon his return to France was appointed preceptor to the duke d'Enghien. He died in the year 1785, at the age of 59. D'Alembert said of the abbé Millot, that he was the person of all others whom he had known, that had "the fewest prepossessions and the fewest pretensions." In society he was modest and rather reserved in his manners, but every

thing which he said was sensible and judicious. His works also exhibit the same candour and cool judgment which were visible in his conversation. They are chiefly historical abridgments, written with care and correctness, in a natural and rather elegant style. The principal are: "Elemens de l'Histoire de France, depuis Clovis jusqu'à Louis XV.," 3 vols. 12mo.; "Elemens de l'Histoire Univerfelle," 9 vols. 12mo.; "Memoires Politiques et Militaires pour servir à l'Histoire de Louis XIV. et de Louis XV.," &c. He published also "L'Histoire des Troubadours," in 3 vols. which work was chiefly drawn from the papers of M. de Sainte Palaye; some "Discourses" read before the academy of which he was a member, and a translation of select harangues from the Latin historians.

MILLOWITZ, in *Geography*, a town of Bohemia, in the circle of Saatz; 10 miles W. of Saatz.

MILLSTREET, a post-town of Ireland, in the county of Cork, chiefly remarkable for a good inn, at which travellers to Killarney usually pass a night. It is 134 miles S.W. from Dublin.

MILLTOWN, a town of America, in the state of Delaware; two miles from Wilmington.—Also, a town in Northumberland county, Pennsylvania, on the E. side of the W. branch of Susquehannah river, containing about sixty houses; 14 miles N. by W. of Sunbury.

MILLTOWN, a post-town of Ireland, in the county of Kerry, which promises to become a good market town by the exertions of sir William Godfrey, and the convenience of water carriage, the tide bringing sloops up the Mang very near to this town. It is 169 miles S.W. by W. from Dublin, and nine miles N.W. from Killarney. Carlisle.

MILLVILLE, a post-town of Cumberland county, New Jersey; 196 miles N.E. from Washington.

MILLWOOD, a post-town of Frederick county, Virginia; 68 miles from Washington.

MILNTHORP, or MILTHORP, a sea-port and market-town in the parish of Heversham, Kendal ward, Westmoreland, is situated near the mouth of the Can, at the distance of five miles from Kendal, and 251 from London. It consists chiefly of one street, which is pretty well built; and at the E. end there are some good houses, in pleasant and open situations. This town is the only sea-port in the county, and has several vessels belonging to it, which trade principally to Liverpool, Port Glasgow, and Annan in Scotland. Here are three rope-yards, two paper-mills, one flax-mill, and one cotton-mill. The market day is Friday, and there is an annual fair on Old May day. A very handsome bridge is thrown across the river Betha, which flows through the town. The resident population here, according to the parliamentary returns of 1801, amounted to 968 persons; 459 males, and 509 females, of which number 113 were returned as employed in agriculture, and 170 in trade and manufactures.

The country around this town is pleasingly diversified with hill and dale, and embellished by a variety of elegant mansions. Of these that of Dallam Tower, the seat of Daniel Wilson, esq. is the most conspicuous. It is situated at the foot of a hill, which rises rapidly from its base, and is covered to the summit by a profusion of trees. In front extends a fine park, adorned with wood, the ground of which rises as it recedes from the house. At Beerham-hill, near this mansion, is a waterfall on the river Beele, well deserving the attention of the curious traveller. Housman's Topographical Description of Cumberland, Westmoreland, &c. 8vo. Carlisle's Topographical Dictionary, 4to.

MILO, in *Biography*, a name that frequently occurs in the Roman classics: we shall notice three persons of note.

Our

One was celebrated at Crotona, in Italy. It is said that he carried on his shoulders a young bullock four years old, and afterwards killed it with a single blow of his fist. He was seven times crowned at the Pythian games, and six times at Olympia.—The second was Titus Annius, a native of Lanuvium, who attempted to obtain the consulship at Rome. Clodius the tribune opposed his views, yet Milo would have succeeded, had not an unfortunate circumstance taken place between his furie and that of Clodius as he was going to the country. Clodius and eleven of his servants were killed, and the body of the murdered tribune was carried to Rome and exposed to public view. Cicero, as is well known to every classical student, undertook the defence of Milo, but with no effect; he was condemned and banished to Massilia.—A third of this name was a general of the forces at Parennum, and that he might not forget the duty and allegiance which he owed to his sovereign, Pyrrhus sent him, as a present, a chain, which was covered with the skin of Nicias the physician, who had perfidiously offered the Romans to poison his sovereign for a sum of money.

MIL0, anciently *Milos*, in *Ancient Geography*, one of the largest and most elevated islands in the southern part of the Grecian Archipelago. According to Thucydides, it was independent, and enjoyed perfect freedom long before the Peloponnesian war. The inhabitants, strongly solicited by the Athenians on the one hand, and on the other attached to the Lacedæmonians, from whom they had descended, wished, in the midst of this terrible war, to remain quiet and to observe a wise neutrality. At this conduct the Athenians were so irritated, that they dispatched Nicias with a fleet of sixty ships, and 2000 land forces to punish them for refusing to furnish their quota of troops. Nicias ravaged this island, but failed with his feeble army to take the town, which was defended by all the inhabitants, assembled for this purpose. Some time after the Athenians sent two other generals, with a more numerous army, who were not more successful than Nicias; but at length, when Philocrates brought fresh troops, the Milots were reduced to the greatest extremity, and obliged to surrender. The Athenians, implacable in their resentment and ferocious in their vengeance, massacred, without discrimination, all the men who were capable of bearing arms, and made slaves of the women and children, whom they carried away to Attica. They then sent 500 persons to repeople the island, and to take possession of the property of those whom they had murdered. In the mean time, the Athenians, conquered in their turn by Lysander, commander of the Lacedæmonian troops, and compelled to surrender at discretion, found themselves constrained to recal their colony; and those who remained of the unfortunate Milots were then enabled to return, and to reinvest themselves with the property which had been taken from them. This island, like all those of the Archipelago, passed under the dominion of the Romans; it afterwards made part of the empire of the East. Marco Santo united it, with all the Cyclades, to the duchy of Naxos; and it was in process of time detached from this duchy in favour of Francesco Crispo; and at length subjected to the Ottoman empire, under which it has lost, together with its liberty, its importance.

Milo is about sixty miles in circumference; it is divided in its middle, and almost through its whole breadth, by a deep bay: this is one of the finest harbours in the Mediterranean, sufficiently spacious to contain a fleet, and to keep the ships belonging to it sheltered from all winds. The anchorage is excellent, particularly at the head of the gulf and near the E. coast; the bottom has a fine sand, and vessels come to anchor there in from 12 to 18 fathom water. Small

craft can approach nearer the coast, and carry out moorings to the rocks of one of the grottoes. Another anchorage, more convenient, and also less exposed to the action of the winds and the violence of the sea, lies on the W. coast, in a cove called "Patricha."

The entrance of the harbour first mentioned faces the N.W.; it is very wide, and ships approach very near to the coasts that form it, without risk. To the starboard, or right, they have Cape Veni, and to the left Cape Lerida; the gulf then contracts between Cape San Dimitri and Cape Bombarda. At the latter, a high mountain, in the form of a sugar-loaf, bears on its summit a village, called "Sifour," surrounded by walls, whence it has the name of Castro: here the pilots for the Archipelago reside. As the air here is pure and wholesome, it is more populous than the capital of Milo, and the inhabitants exhibit signs of vigour and health, not common in other parts of the island. It is not improbable that the principal place of the isle of Milo was near the site of Sifour, which commands an extensive prospect; more especially as the ancient habitations of the Archipelago are built on eminences the most lofty, and the most rugged of access. Near this place are considerable ruins, fragments of columns of Parian marble, and subterraneous galleries, antique catacombs, which furnish funeral inscriptions, vases, idols, and medals, and other remains of a considerable city. The women of Sifour, or Sefours, employ themselves the whole year in knitting cotton stockings, and making coarse calicoes. The men cultivate the earth, or are mariners. Near this place, on the summit of a hill, is at present a church of Caloques, built, as Olivier conceives, on the ruins of a temple. However, the capital of the island is a town of the same name, situated on a plain formerly not inferior to any other of the Archipelago, but now presenting scarcely any thing but ruins. Scarcely do forty families drag on their unfortunate existence, with consumptive aspects, in a town which reckoned 5000 inhabitants within its walls. At the beginning of the last century, Tournefort discovered, in 1700, that the air of Milo was insalubrious, and that the inhabitants were subject to dangerous disorders; but the unwholesomeness of the air must have increased very much since that epoch. In traversing the island to the monastery of St. Marino, Mount St. Elias, the most lofty point in the island, and the volcanic mountain of Calamo, the country presents various traces of its volcanic origin. At the distance of a quarter of a league from Milo alum is formed, which has been mentioned both by ancient and modern writers. In the same grotto that furnishes this alum, are also found crystals of gypsum, but the heat is such as not to admit its being examined for any long time. The baths called "Loutra" were also situated in this quarter. The water is strongly charged with alum and marine salt. These baths were anciently much frequented by Greeks, who repaired hither from all the Cyclades in order to obtain relief in disorders of the skin, as well as in rheumatism and palsy. Spacious grottoes occur frequently, and in these are subterraneous caverns, full of turnings and twinings, and into which the descent is steep and laborious. The chambers which they contain appear to have been formerly used as habitations and places of concealment.

Near the site of an ancient town, called "Clima" by the modern Greeks, are sepulchres or catacombs, in which, at an unknown period, the inhabitants of Milo deposited their dead. Each of these catacombs generally contains seven sarcophagi five and a half or six feet long, and a foot or fifteen inches deep, surmounted by an arch and dug in the rock. The whole island indicates a subterraneous configura-

gration; and in several places the ground which rebounds under your feet apprizes you that it covers vast cavities. Every appearance testifies, that the stones and pebbles which are found here have been thrown up by the explosion of a volcano; boiling waters issue on all sides; pumice stones are scattered abroad; sulphur is formed in abundance, and shews itself on the surface of the ground. Nevertheless, the vegetable earth, which mostly covers the island, gently warmed by subterraneous heat, is very productive. Corn and cotton are here of an excellent quality; the vines yield good wine, and the trees afford delicious fruits; but the quantity of lands that lie fallow announces an excessive diminution in the population, as well as the criminal indifference of the government. Ships still come to Milo to fetch away a great quantity of the solid lava, of which mill-stones are made, which are transported to several countries of the Levant, particularly to Egypt and Constantinople. The island likewise contains many mines of iron and ferruginous pyrites, from which no advantage is derived. Under a liberal administration other valuable articles might be found, and the island might even cease to be an unhealthy abode. The whole population at present does not amount to 500 persons, and this small number would daily decrease, if it was not kept up by emigrants from the Morea, where distress constrains them to seek new habitations, and who are attracted to Milo with a view of cultivating the lands. The captain-pacha has some difficulty in levying 2500 piastrres by way of impost. N. lat $36^{\circ} 40'$. E. long. $24^{\circ} 30'$. Sonnui and Olivier.

MILOPOTAMO, in *Geography*, a town and fortress of the island of Candia; 28 miles W.N.W. of Candia.

MILORRA, a small island in the East Indian sea, between Ternate and Tidor.

MILOSŁAW, a town of the duchy of Warsaw; 20 miles S.S.W. of Gnesna.

MILPHOSIS, $\mu\lambda\phi\sigma\iota\varsigma$, a Greek word used by the ancient medical writers, as a name of the disease of the eye-lids, by which the hairs fall off from them, and the edges become red and tumid.

MILREA, or MILREE, in *Commerce*, a money of account in Portugal, so called, because 1000 reas, or rees, are = 1 milree. In the notation of accounts, the milrees are separated from the rees by a crossed cypher, called "Cifraon," and the milrees from the millions by a colon; thus, Rs. 2 : 700 \oplus 500, means two thousand seven hundred mil. and five hundred rees. As the crusado of exchange, or old crusado, is 400 rees, the new crusado, 480 rees, the testoon, 100, and the vinten or vintem, 20 rees; the milree is = $2\frac{1}{2}$ old crusados = $2\frac{1}{2}$ new ditto = 10 testoons = 50 vintens. The milree valued in gold is worth $67\frac{1}{2}d.$ sterling, and the same in silver is worth $68\frac{3}{4}d.$ sterling. The milree is also a gold coin, struck for the Portuguese possessions in Africa in 1755; it weighs 19 $\frac{1}{2}$ grains, and contains, in pure gold, 18.1 grains, and is valued at $3s. 2\frac{1}{2}d.$ sterling. See COIN.

MILSTATT, or MUHLSTADT, in *Geography*, a town of the duchy of Carinthia, situated on the Militatter see; 40 miles N. of Goritz. Militatter see is a lake of Carinthia, 9 miles E. of Saxenburg.

MILT, in *Anatomy*, a popular name for the spleen.

MILT, or Melt, in *Natural History*, the soft roe in fishes; thus called because it yields, by expression, a whitish juice resembling milk. See ROE.

The milt is properly the seed, or spermatic part of the male fish.

The milt of a carp consists of two long whitish irregular bodies, each included in a very thin fine membrane.

M. Petit considers these as the testicles of the fish wherein the seed is preserved: the lower part, next the anus, he takes for the vesiculae feminales. Vide Mem. Acad. R. Scien. anno 1733, p. 291.

In the milt of a living cod-fish there are such incredible numbers of those small animalcules found in the male-seed of all animals, that in a drop of the juice of it, no more in quantity than a small grain of sand, there are contained more than ten thousand of them; and, considering how many such quantities there are in the whole milt of one such fish, it is not exceeding the bounds of truth to affirm, that there are more animals in one milt of it, than there are living men at one time upon the whole face of the earth. However strange and romantic such a conjecture may appear at first sight, a serious consideration, and calculation, will make it appear very plain. A hundred such grains of sand as here mentioned, will make about an inch in length; therefore in a cubic inch there will be a million of such sands.

The milt of one of these fishes is frequently about the quantity of fifteen cubic inches, it must therefore contain fifteen millions of quantities as big as one of these sands; and if there be ten thousand animals in each of these quantities, there must be, in the whole, a hundred and fifty thousand millions: which is a number vastly exceeding the number of mankind, even though we were to suppose the whole earth as populous as Holland. See Philosophical Collections, p. 4. See *Fecundity of FISH*.

MILT *Wasse*, or *Ceterach asplenium*, in *Botany*. (See ASPLENUM.) The leaves are recommended as a pectoral similar to maidenhair, or Asplenium trichomanes; to which they have been frequently joined in infusions and apozems; and likewise as an aperient in obstructions of the viscera. They possess likewise a diuretic virtue, and appear to gently carry off sand, cleanse the kidneys, and allay pains in the urinary passages. The way of using them is to drink infusions of them in the morning, as tea, with the addition of such other medicines as particular cases may require. See CETERACH, ASPLENUM, and TRICHIOMANES.

MILTENBERG, in *Geography*, a town of Germany, on the Maine; 26 miles N.E. of Heidelberg.

MILTHORP. See MILNTHORP.

MILTIADES, in *Biography*, a celebrated Athenian general, the son of Cimon, and grandson of Miltiades, who founded an Athenian colony on the Thracian Chersonesus. After the assassination of Stefagoras, in the colony, Miltiades was sent from Athens to take the command, and having got into his power the principal men of the Chersonesians, he made himself master of the whole district, and married the daughter of the king of Thrace. When Darius I., king of Persia, undertook an expedition against the Scythians, and throwing a bridge across the Danube marched into their country, he entrusted the guard of the bridge to the Ionian Greeks, the commanders of whom he had attached to himself, by raising them to the supreme authority in their several cities. Miltiades, who was one of them, excited by that spirit of Grecian patriotism, to which every other duty was made subservient, urged the other leaders to break down the bridge, in order that a prince so entirely inimical to Grecian liberty might never return in safety. His counsel was approved by all the rest except Hylliaeus the Milesian, who had influence enough to prevent its taking effect. Miltiades, judging it imprudent to await the monarch's return, embarked for Athens, and in his way took possession of the isle of Lemnos for his countrymen. Darius, after his return from his Scythian expedition, having retolved upon the conquest of Greece, sent Mardonius at the head of a powerful army to invade it. When he had arrived at

the

the plains of Marathon, within ten miles of the capital, Athens, the alarm of the citizens became extreme, and in their despair they took the resolution to march out to meet the foe, with such troops as they could assemble, soliciting, at the same time, succours from the other Grecian states. But of the battle of *Marathon*, we have already given an account under that article. Miltiades, who was unquestionably the grand instrument in obtaining this victory, was next entrusted with a strong armament fitted out for the reduction of some of the islands which had taken part with the Persians. He sailed to Paros, and laid siege to its capital, but either a false alarm of the approach of the Persian fleet, or an unsuccessful attempt to gain the place, in which he was wounded, caused him to return without effecting his purpose. The disappointment of the Athenians was so great, that Miltiades was accused of treason before the assembly of the people, who, forgetting his past services, by which they had been delivered from a foreign yoke, condemned him to death. Upon, however, the payment of a heavy fine, he was exempted from capital punishment, but was thrown into prison, where, to the everlasting disgrace of his countrymen, he died of a broken heart, in the year after the battle of Marathon. Corn. Nepos. Univer. Hill.

MILTON, JOHN, in *Biography*, the father of our great poet, though a scrivener (or banker) by profession, was a voluminous composer, and equal in science, if not genius, to the best musicians of his age; in conjunction, and on a level with whom, his name and works appeared in numerous musical publications of the time, particularly in those of old Wilbye; in the "Triumphs of Oriana," published by Morley; in Ravenscroft's "Psalms;" in the "Lamentations," published by Sir William Leighton; and in MS. collections, still in the possession of the curious. The late Mr. T. Warton, in his notes on the *Minora* of Milton, tells us, from the MS. Life of the Poet, by Aubrey, the antiquary, in the *Mus. Ashm. Oxon.* that "Milton's father, though a scrivener, was not apprenticed to that trade: having been bred a scholar, and of Christ-church, Oxford; and that he took to trade in consequence of being disinherited." Mr. Warton therefore observes, that Milton, in his Latin epistle to his father, addresses him in a language which he understood. Aubrey adds, "that the elder Milton died very old in 1647, and was interred from his house in Barbican, in St. Giles's church, Cripplegate; where the great poet was afterwards buried, near his father, in 1674."

His son celebrates his musical abilities in an admirable Latin poem, "Ad patrem," where, alluding to his father's musical science, he says, that Apollo had divided his favours in the sister arts between them; giving music to the father, and poetry to the son.

"Nec tu perge, precor, sacras contemnere musas,
Nec vanas inopesque puta, quarum ipse peritus
Munere, mille sonos numeros componis ad aptos,
Millibus et vocem modulis variare canoram
Doctus, Arionii merito sis nominis hæres.
Nunc tibi quid mirum, si me genuisse poetam
Contigerit, charo si tam prope sanguine juncti
Cognatas artes, studiumque affine sequamur?
Ipse volens Phœbus se dispertire duobus,
Altera dona mihi, dedit altera dona parenti,
Dividuumque Deum genitorque puerque tenemus."

Ver. 56. usque 66.

His effusions of gratitude for the education he had received from his parent's bounty, and his apology for cultivating poetry, of which he gives a charming eulogium,

seem to contain ideas as beautiful and sublime, as any in his *Para-life Loll.*

MILTON, JOHN, the most illustrious of English poets, was descended from an ancient family settled at Milton, in Oxfordshire. His father, who had been brought up in the Roman Catholic religion, and by embracing the Protestant faith had been disinherited, came to London and followed the profession of a scrivener, and marrying a woman, exemplary for her numerous virtues and extensive charities, had two sons and a daughter; viz. John, the subject of this article, Christopher, and Anne. Of the two latter, Christopher, applying himself to the study of the law, became a benchler of the Inner Temple, and at an advanced period of his life was knighted, and raised by James II., first to be a baron of the exchequer, and afterwards one of the judges of the court of Common Pleas. During the civil war he followed the royal standard, and effected his composition with the victors by the prevailing interest of his brother. In his old age he retired from the fatigues of business, and closed, in the country, a life of study and devotion. His sister, Anne, married Mr. Edward Philips, a native of Shrewsbury, who, coming to London, obtained the lucrative place of secondary in the crown office in chancery: by him she had several children, of whom Edward and John only survived to maturity; the former became the biographer, after having, with his brother, been the pupil of his uncle, our author. By a second husband, Mr. Agar, she had two daughters, of whom Mary died young, and of the other, Anne, nothing more is known, than that she was living in the year 1694.

John Milton, the subject of the present article, was born at his father's house, in Bread-street, London, on the 9th of December, 1608. His promise of future excellence was made at a very early period: every incitement to exertion, and every mode of instruction adapted to the disposition and powers of the child, were employed, and no means, probably, were omitted to expand the intellectual Hercules of the nursery into the full dimensions of that mental amplitude for which he was intended. The portrait of him was painted, when he was only ten years old, by the celebrated Cornelius Jansen; hence we may infer that the son, who was made the object of so flattering a distinction by a father, in competent, but by no means in affluent circumstances, could not have been a common child. Of himself, at this period, he gives the following account. "My father destined me, when I was yet a little boy, to the study of elegant literature, and so eagerly did I seize on it, that from my twelfth year, I seldom quitted my studies for my bed till the middle of the night. This proved the first cause of the ruin of my eyes; in addition to the natural weakness of which organs, I was afflicted with frequent pains in my head. When these maladies could not restrain my rage for learning, my father provided that I should be daily instructed in some school abroad, or by domestic tutors at home." "How great," says Dr. Symonds, "are the obligations of Britain and the world to such a father, engaged in the assiduous and well directed cultivation of the mind of such a son." Some part of his early education was committed to the care of Mr. Thomas Young, a puritan minister, and native of the country of Essex, afterwards chaplain to the English merchants at Hamburgh, a man whose merits are gratefully commemorated by his pupil in a Latin elegy. About the age of fifteen he was sent to St. Paul's school, of which Mr. Alexander Gill was then master, and there he began to distinguish himself by his intense application to study, and his poetical talents. Ardent in his love of knowledge, he was regardless of pleasure, and even of health, when they came

into competition with the prevailing passion of his soul, and we are consequently not surprized by the extraordinary and brilliant result which soon flashed upon the world. It is conjectured that it was at this early period he imbibed the spirit of devotion which actuated his bosom to his latest moments. For this he was probably indebted to his father, who would naturally be solicitous to stamp upon the tender bosom of his son, that conviction and feeling of duty which were impressed so deeply on his own, and which he had exhibited in his abjuration of those errors in which he had been educated. He intended his son for the church, and on that account would be more anxious to incline him to devotional principles and practice. The sentiments and the warmth thus communicated to the mind of the youth, would unquestionably be strengthened by the lessons and example of his preceptor, Mr. Young, in whom religion was carried to enthusiasm. To Milton's devotional turn of mind we are probably indebted, not merely for the subject, but for a great part of the sublimity of the *Paradise Lost*. On the 12th of February, 1624-5, he was entered a pensioner at Christ's college, Cambridge, under the tuition of Mr. W. Chappel. Of his course of studies in the university little is known, but he gave proof of the extraordinary skill he had acquired in writing Latin verse, by several exercises preserved among his works, and which are of a purer classical taste than any preceding compositions of the kind by English scholars. It appears that some part of his conduct brought upon him academical punishment; but whatever were the cause, he felt no shame on account of it, but refers spontaneously to the circumstance in the following lines:

“Nec duri libet usque minas perferre magistri
Cateraue ingenio non subeunda meo.
Si sit hoc exilium patrios adiisse penates
Et vacuum curis otia grata sequi.”

Which have been translated by his biographer.

“And ill my soul a master's threats can bear,
With all the fretting of the pedant's war.
If this be banishment—all cares aloof—
To live my own beneath a father's roof—
Still let an idle world condemn or not,
Mine be a truant's name,—an exile's lot.”

From these lines, the enemies of Milton have inferred that he was subjected to corporal punishment, and that he was dismissed from his college for irregularity of conduct. Dr. Symmons has, with a proper degree of indignation, vindicated completely the character of Milton from these vile aspersions. Our limits will not permit us to follow him through the steps of the arguments, but they appear perfectly satisfactory. The doctor, speaking of the calumnies spread on this subject, says, “In opposition to this pretended evidence, stand the records of our author's university, and the force of his own positive declarations. By the former of these, which prove that he took his bachelor's degree as soon as it could be taken, it is made highly probable, if not absolutely certain, that he lost no term; and by the latter we are assured that he was not only exempted from punishment during his continuance at Cambridge, but in that seat of learning was an object of affection and respect.”—And again, “With respect to Milton, we may be confident that no immorality could be the cause of his punishment. Religion, as we know, took early possession of his bosom, and he who, with weak eyes and an aching head, could consecrate one-half of the night to study, cannot be suspected of stealing the other half from repose, for the purpose of confounding it with excess, or of polluting it with debauch.

A mind, indeed, like his, exulting in the exercise of its higher powers, and intent on the pursuit of knowledge, could not, without a violation of its nature, submit to licentious indulgencies. The cultivation of intellect not only diverts the attention from sensual pleasure, but inspires a pride which subdues its fascination: and while the spectacle of the world exhibits innumerable instances of men of genius hurrying into excessive gratification, it scarcely presents us with one, under the influence of the same unfortunate error, among the assiduous votaries of knowledge.”

Milton probably became obnoxious to the governors of his college by the bold avowal of his puritan opinions, which he had imbibed from his tutor Young, or by his dislike to the discipline of the established religion, or to the plan of education pursued in the university; hence he might lose the favour of his superiors in the college, and be exposed to their censures without incurring the slightest loss of character, or sustaining the most trifling diminution of general esteem.

He took the degrees of bachelor and master of arts, the latter in 1632, when he left the university. In the seven years of his academical life, his vigorous and ardent genius broke out in frequent flashes, and evidently disclosed the future author of “*Comus*” and “*Paradise Lost*.” He was a poet when he was only ten years old, and his translation of the 136th psalm evinces his progress in poetic expression at the early age of fifteen. He renounced his original purpose of entering the church, for which he assigns as a reason, “that coming to some maturity of years, he had perceived what tyranny had pervaded it, and that he who would take orders, must subscribe slave, and take an oath withal, which, unless he took with a conscience that could retch, he must either strain, perforce, or split his faith; I thought it better to prefer a blameless silence before the office of speaking, bought and begun with servitude and forswearing.” This denotes a mind resolved to think and act for itself, and it cannot be doubted that Milton was already marked with that firm unyielding temper, which, in some degree, is a necessary concomitant of a superior mind. He now returned to his father, who had retired from business, to a residence at Horton, in Buckinghamshire, and there passed five years in a course of classical study, and in the composition of some of his finest miscellaneous poems. This was the period of his *Allegro* and *Penseroso*, his *Comus* and *Lycidas*. “*L'Allegro* and *Il Penseroso*,” says Dr. Symmons, “were certainly written at Horton, and probably at no long period before the *Lycidas*, which was the last of our author's works while he resided with his father. They were composed in the happiest humour of the poet's mind, when his fancy was all sun-shine, and

————— no cloud, or, to obstruct her view,
Star interposed.

We may contemplate them not as the effects or qualities, but as the very substance of poetry, as its “hidden soul untied, and brought forward to our sight.” In comparing the merits of these pieces, Dr. S. gives the preference to *Il Penseroso*. “The portrait of contemplation,” says he, “the address to Philomel; the image of the moon wandering through heaven's pathless way; the slow swinging of the curfew over some wide-watered shore; the flaming of the night lamp in some lonely tower; the unsphering of the spirit of Plato to disclose the residence of the unbodied soul; the arched walks of twilight groves; the mysterious dream by the murmuring waters; the sweet music of the friendly spirit of the wood; the pale studious cloister; the religious light thrown through the storied windows; the pealing organ, and finally the peaceful hermitage—

form together such a mass of poetic imagery as was never before crowded into an equal space: the impression made by it on the imagination is to be felt and not explained." The pale and studious cloister having been objected to, in one of Mr. Wharton's criticisms, Dr. Symmons remarks, that the word *pale*, as an epithet to cloister, is most happily poetic, and as holding a large and animated picture to the imagination. It shews the ghastly light of the place, the sickly cheek of timorous superstition, and the wan and faded countenance of studious and contemplative melancholy.

In 1638, having obtained his father's consent to improve himself by foreign travel, Milton set out for the continent. At Paris he was received with distinction by lord Sendamore, the ambassador from England, by whom he was introduced to the notice of the illustrious Grotius, who then resided in the French capital, as the minister of Christina, the queen of Sweden. After the delay of a few days at Paris, he renewed his progress, and pursued the direct road to Nice, where a vessel received and landed him at Genoa. From this city he passed immediately through Leghorn and Pisa to Florence, and on the banks of the Arno he made what may be regarded as his first pause. Here he resided two months, and by the brilliancy of his conversation, and mildness of his manners, made himself the object of very general admiration. Here he obtained admission into those private academies, which had been instituted by the Medici for the advancement of literature, and for the cementing of friendships among its votaries. The English bard could in this place enumerate in the list of his friends all the great, the respectable, and deeply learned men of Italy, who appear to have been lost in surprise at the spectacle, presented to them, of a native of Britain, a country just emerging, as they imagined, from barbarism, who to an acquaintance, not superficial, with all the sciences, united a profound knowledge of classical and Italian letters; whose mind was at once sublime and deep, accurate and comprehensive, powerful and acute; patient to follow judgment in the gradual investigation of philosophical truth, yet delighted to fly with the more aerial offspring of the brain on the high and expatiating wing of imagination. During this visit to Florence he saw and conversed with the great Galileo, that memorable victim of priestly ignorance and superstition. "There it was," says Milton, "that I found and visited the famous Galileo, grown old, a prisoner to the Inquisition, for thinking in astronomy otherwise than the Franciscan and Dominican licensers thought." On his leaving Florence, our traveller proceeded through Sienna to Rome, and then visited Naples, where he was kindly received by Manfo, marquis of Villa. At Rome he was introduced, by Holstenius, the learned keeper of the Vatican library, to the attentions of cardinal Barberini, who at that time possessed the whole delegated sovereignty of Rome under his uncle, Urban VIII. At a great musical entertainment which the cardinal gave, he looked for our traveller among the crowd at the door, and brought him, almost by the hand, into the assembly. It is supposed, that it was at this concert Milton was first struck with the charms and the inimitable voice of Leonora Baroni, which had been made the general theme of their praise by the contemporary poets of Italy: and she is probably the person who has been celebrated by Milton in her own language, and who was the object of his love in his Italian sonnets.

At Naples the attentions paid to Milton were of the most flattering nature; the marquis of Villa not only conducted him through the viceroy's palace, and to a sight of all that was worthy to be shewn in the city, but honoured

him also with some familiar and very friendly visits. The imprudent freedom, with which Milton had discovered his sentiments on the subject of religion, was the only circumstance which deprived him of a still more unreserved intercourse with this elegant and accomplished nobleman. Having completed his intended residence at Naples, he began to make preparations for the execution of the remaining part of his plan of travel, which extended to Sicily and Greece; but while he was engaged in this business he received letters from England, acquainting him with the distracted state of his country, and with the near prospect of a civil war; he determined to return. "As I was desirous," he says, "to pass into Sicily and Greece, the melancholy intelligence from England of the civil war recalled me; for I esteemed it dishonourable for me to be lingering abroad, even for the improvement of my mind, when my fellow-citizens were contending for their liberty at home." He, however, resolved to revisit Rome, where he remained two months; and whenever his religion was attacked, he scrupled not to vindicate its principles with spirit and ardour, even within the precincts of the sacerdotal palace. From Rome he went to Florence, and his second visit to this city, which the kindness of his friends made a species of home to him, was of equal duration with his first. When he departed from Florence, he crossed the Apennines, and travelled through Bologna and Ferrara to Venice. He spent a month in viewing the curiosities of this celebrated city, and then pursued his returning course through Verona and Milan, over the Alps, and by lake Lemanus to Geneva. Here he contracted an acquaintance with two learned divines, John Diodati and Frederic Spanheim. He now returned through France to England, having been absent about fifteen months. On his arrival he found the civil commotions of his country hastening to a crisis, and as he had expressed impatience to be present on the theatre of these disputes, it has been thought extraordinary that he did not instantly take upon himself some active part. But his tastes and habits were altogether literary, and he had been long pondering upon some subject of English poetry worthy of his genius, and capable of being made a passport to the immortality to which he aspired. For the present, therefore, he fixed himself in the metropolis, undertook the education of his sister's sons, of the name of Philips. Shortly after he was applied to by several parents to admit their children to the benefit of his tuition, to which he assented, and by this means he has exposed himself to the title of school-master, which his enemies, and the enemies of human happiness and intellectual improvement, who employed it as a term of reproach, conceived to be of a nature to degrade him. He took a house in a garden in Aldersgate-street, and opened an academy for board and education. Here, in his little circle of scholars, he was usefully, if not splendidly, engaged; and he could not perhaps conceive, while he was essentially promoting the highest interests of some of his species, that he was degrading himself in the estimation of the rest. In his conduct to his pupils, he was familiar and free where he could be so, and was never rigid but by compulsion. His form of instruction respected things more than words, and attempted to communicate knowledge when the understanding was, perhaps, incapable of receiving more than the key which opened the important gate. Instead of the common classics, he put into the hands of his scholars such Latin and Greek authors as treated on the arts and sciences, and philosophy. These were ill calculated to render learning pleasant to beginners, and from the imperfect state of ancient science, such a course was as likely to inculcate error as truth. He performed the duties

Duties of instruction with great assiduity, and set the example of hard study and spare diet to his pupils, whom he seems, in some respects, to have disciplined with the severity of old times.

Milton did not very long continue inactive in the public cause, and his principles made it no matter of doubt which side he should espouse in the contentions of his country. Conscious of his own proper strength, and sensible that genius armed with knowledge was a power of far greater and more extensive efficiency than the bodily force of any individual, he accordingly decided in favour of the pen against the sword; and stationed himself in the closet, where he was himself a host, rather than in the field, where every muscular private man would have been his superior. In the year 1641 he published four treatises relative to church government, in which he attacked episcopacy, and supported the cause of the Puritans. These were followed by another in the next year, relative to the same controversy, and he reckoned among his antagonists such men as bishop Hall and archbishop Usher. His father, who had been molested in his residence by the king's troops, came to live with him, and spent his latter years, in tranquillity, under his son's roof. In 1643, Milton married Mary, daughter of Richard Powell, esq., a magistrate in Oxfordshire. This was a very unsuitable connection, for the father-in-law was a zealous royalist, and the daughter had been accustomed to the jovial hospitality of the country gentlemen of that party. After a month's experience of her new life, the lady sighed for the gaieties which she had left, and obtaining permission, by the earnest request of her relations, for a short absence, she revisited her native place. Here she continued during the remainder of the summer, nor could the letters, messages, and remonstrances of her husband bring her back. Incensed at her neglect and ill treatment of him, he began to consider her conduct as a desertion of the nuptial contract, and resolved to punish it by repudiation. He soon found arguments to justify it to the world, and published, in 1644, "The Doctrine and Discipline of Divorce," which was followed by "The Judgment of Martin Bucer concerning Divorce." By these writings the fury of the Presbyterian clergy was instantly kindled, and they procured the author to be summoned before the house of lords, but that body did not choose to enter into the question, and soon dismissed him. The Presbyterians were now left without any consolation for the loss of an able friend, and the excitement of a formidable enemy. Milton now was irrevocably alienated from their cause, and he soon fully discovered that many of these pretended zealots of liberty fought only their own aggrandizement, and the power of imposing upon others a yoke which they had themselves been unable to bear. On the subject of divorce he makes out a strong case, and appealed to the whole tenour of the scripture; the laws of the first Christian emperors; the opinions of the most eminent among the early reformers; and endeavours to shew that by the laws of God, and by the inferences of the most virtuous and enlightened men, the power of divorce ought not to be rigidly restricted to those causes which render the nuptial state unfruitful, or which taint it with spurious offspring. Regarding mutual support and comfort as the principal objects of this union, he contends, that whatever defrauds it of these ends essentially vitiates the contract, and must necessarily justify its dissolution.

Milton, in conformity to this theory, resolved practically to act upon it, and began to pay his addresses to a young lady of great accomplishments, the daughter of a Dr. Davies. The rumour of the intended alliance effected what his re-

monstrances had been unable to do; as he was paying a visit to a neighbour, he was surprised with the sudden appearance of his wife from another room, who threw herself at his feet and implored forgiveness. After a short struggle of resentment, he relented, and took her again to his bosom. The reconciliation was lasting and sincere, and Milton nobly sealed it by opening his house to her father and brothers, when they had been driven from home by the triumph of the republican arms. He was now obliged to take a larger mansion, and removed to Barbican. In this asylum his wife's relations continued, till the question respecting their property was adjusted with the government, and till a period subsequent to the death of Milton's father. Under the pressure of these domestic embarrassments, and of the public interest, the intellect of our author, obedient to a heart actuated by the purest benevolence, was busy in promoting the welfare of the human race. In the year 1644, he imparted to the world his ideas on the subject of education, and defended, with a power which has never been exceeded, that guardian of liberty and truth, the freedom of the press.

His "Tractate on Education," addressed to Mr. Hartlib, the friend of sir William Petty, contains his thoughts on that important subject. From this it appears, he conceived it possible to initiate the young student into science and language by the same process, and to make an acquaintance with things the immediate result of an acquaintance with words. Between the years of twelve and twenty-one, the pupil is to be led through various languages from grammar to ethics, logic, rhetoric, politics, law, theology, criticism, and the practice of composition. Geography was to exhibit to him the surface of the globe, and the principles of astronomy were to unfold to him the heavens; natural philosophy, comprehending anatomy and physiology, was to make him conversant with the phenomena of nature, and with the wonders of his own frame; the mathematics were to introduce him to the sciences of architecture, engineering or gunnery, fortification, and navigation. With this kind of education, Milton's pupil was to be accomplished, and fit for any duty to which his country might summon him, in the pulpit or at the bar, in the senate or the field. During the course of these studies, the body of the student was to receive its due share of cultivation, to be maintained in health by temperance, and to be invigorated by exertion. This little piece is written in an easier and purer style than the preceding works of its author; but in every species of merit it must yield to another composition, produced nearly at the same time, by the same pen, and addressed to the parliament, with the title of "Areopagitica, or a speech for the liberty of unlicensed printing." The Presbyterians, on their rising into power, forgot the principles which they had professed in their adversity; and, declaring against unlimited toleration, discovered by their readiness to violate the rights of others, that their tenderness was only for their own. Against these apostates to the cause of liberty, Milton advanced as the champion of free discussion; and the effect of his zeal in this instance, for the interests of genuine liberty, has received the unanimous acclamation of the world. Though his controversial, and other engagements, had for some time suspended the exertion of his poetical talents, yet he did not suffer his character as a poet to sink into oblivion, and in 1645, he published his juvenile poems in Latin and English. In 1646, Milton's wife produced her first child, and in the following year, in which his father died, the Powells returned to their own mansion, and his house was resigned once more to literature. In this house, in which his second daughter Mary was born, he did not continue long, but exchanged it for one of smaller dimensions.

in High Holborn. His next removal was occasioned by his acceptance of the office of Latin secretary, which rendered a situation nearer to Whitehall an object of convenience.

Milton's principles of the origin and end of government, carried him to a full approbation of the trial and execution of the king, which was the final catastrophe of the civil wars; and in order to conciliate the minds of the people, which were agitated by the outcries, as well of the Presbyterians as the loyalists against that act, he published early in 1649, a work, entitled "The Tenure of Kings and Magistrates," proving that it is lawful, and that it hath been so held through all ages, for any who have the power, to call to account a tyrant or wicked king, and, after due conviction, to depose and put him to death, if the ordinary magistrates have neglected or denied to do it. He soon after attempted to support the new order of things, by a pamphlet animadverting upon the revolt of the Scotch Presbyterians, settled at Belfast, from the parliament. With the view of preserving the republican spirit of the nation, he also employed himself in composing "A History of England" from the earliest periods, of which he wrote six books, but left the work unfinished. His progress was stopped by an appointment to the Latin secretaryship to the council of state. Scarcely was Milton seated in his new office, when he was summoned by the government to the discharge of a duty, well adapted to the extent of his powers, and one of considerable importance; it was to write an answer to the famous royal work, as it was then supposed to be, entitled "Icon Basilikè," or the portraiture of his sacred majesty in his solitudes and sufferings. Milton chose for the title of his work "Iconoclastes," or Image-breaker: this piece, says his biographer, Dr. Symmons, "may be regarded as one of the most perfect and powerful of Milton's controversial compositions. Pressing closely on its antagonist, and tracing him step by step, it either exposes the fallacy of his reasoning, or the falsehood of his assertions, or the hollowness of his professions, or the convenient speciousness of his devotion. In argument, and in style compressed and energetic, perspicuous and neat, it discovers a quickness which never misses an advantage, and a keenness of remark which carries an irresistible edge." This work was first printed in 1649, and a second edition of it appeared in the following year; it was published again in London in 1652, in a French translation, and was answered in 1651, in a work, entitled "Icon-oclastes," or the Image unbroken, and also forty years afterwards in another piece, called "Vindiciæ Carolinae." We have in the article GAUDEN shown that the "Icon-Basilikè" was written by that prelate, and not by king Charles, to whom it was generally imputed. This has been satisfactorily proved by the assertions of the two sons of the king, viz Charles II. and James II.; by letters of the Lord chancellor Hyde, and Dr Gauden himself; and by the specific depositions of the doctor's friend Dr. Walker, and of his widow. Doubts of the real author of the "Icon Basilikè" were entertained almost immediately upon its publication by Milton, and by other persons. Milton probably had no doubt whatever of its spuriousness, but was without any specific evidence to bring home the charge, he therefore answered the book, and its arguments, without regard to the writer, for he expressly says, "But the matter, here considerable, is not whether the king, or his household rhetorician, have made a pithy declamation against tumults, but first, whether there were tumults or not, &c." It was also, in the year 1649, attacked as the work of a clergyman who was looking to preferment as a reward, in an able piece, entitled "Icon-alethinè," or the true image. To this work is prefixed a frontispiece, in which, on a curtain being drawn

aside, is discovered a digressary of the church of England in his full canonical dress, and beneath are inscribed the following lines:

"The curtain's drawn; all may perceive the plot,
And him, who truly the black base brought.
Whose fable mantle makes us bold to say,
A Phaeton Sol's chariot ruled that day.
Presumptuous priest! to step into the throne;
And make the king, his ballard issue own!
The author therefore hath conceived it meet,
The doctor should do penance in this sheet."

On the appointment of Milton to the office of Latin secretary, he removed to a lodging at Charing Cross, and afterwards to apartments in Scotland Yard. Here his wife presented him with a third child, a son, who died in his infancy. In 1652 he changed his residence to Petty France, which he occupied for eight years, till the crisis of the restoration, a handsome house opening into St James's park.

Scarcely had Milton finished his reply to the "Icon Basilikè," than he was called upon to justify the principles of the commonwealth in England, in opposition to Salmastius, an honorary professor in the university of Leyden, who had been hired by Charles II. to write a work in favour of the royal cause, which he entitled "Defensio Regia." Salmastius was, by much, a more powerful antagonist than Dr. Gauden, and the contest was to be decided in a more ample field, than that in which Milton had engaged with the "Icon Basilikè." The powers of his mind were now to be exhibited to Europe; and the whole circle of the civilized and Christian community was to witness his triumph or defeat. In 1651, he performed the task allotted him in a work under the title of "Defensio pro Populo Anglicano;" in this he exercised all the powers of Latin rhetoric, as well to justify the republican party, as to confound and vilify the celebrated scholar against whom he took up his pen. By this, notwithstanding the party virulence, with which, by the custom of the times, it was debased, he acquired a high reputation both at home and abroad. He was visited on the occasion by all the foreign ambassadors then in London, was complimented by several eminent scholars on the continent, and received, as a remuneration for his labours, a thousand pounds from the English government. His book was generally read by literary enquirers of all parties, while, on the other hand, the work of Salmastius was condemned and suppressed by the states of Holland. One source of triumph arose to Milton's enemies; in consequence of this controversy, his intense application to study deprived him of that sight, which had been for some years declining. His physicians had warned him, that the exertion necessary to accomplish such a work would probably induce total blindness, but his attachment to the public cause of his country and the world, made him readily submit to any privations which were merely personal, so that he might render that service which the exigencies of the times required.

That such were his motives, we have his own declarations, in a fine sonnet addressed to his friend Cyriac Skinner, which our readers will thank us for transcribing.

"Cyriac, this three years day, these eyes, though clear
To outward view, of blemish or of spot,
Bereft of light, their seeing have forgot;
Nor to their idle orbs doth sight appear
Of sun, or moon, or star throughout the year,
Or man or woman;—yet I argue not
Against Heaven's hand or will, nor bate a jot
Of heart or hope; but still bear up and steer

Right

Right onward What supports me, dost thou ask?

The conscience, friend, to have lost them overplied

In liberty's defence, my noble task,

Of which all Europe rings from side to side:

This thought might lead me through the world's vain mask,

Content, though blind, had I no better guide."

And in plain prose he says, in his "Second Defence," "When the task of replying to the defence of the king was committed to me, at a time when I had to contend with ill-health, and when one of my eyes being nearly lost, my physicians clearly predicted, that if I undertook the laborious work, I should soon be deprived of both; undeterred by the warning, I seemed to hear a voice, not of a physician, but of some internal and more divine monitor; and conceiving that by some fatal decree, the alternative of two lots was proposed to me, that I must either lose my sight, or must desert a high duty, the two destinies occurred to me, which the son of Thetis reports to have been submitted to him by his mother, from the oracle of Delphi. Reflecting, therefore, with myself, that many had purchased less good with greater evil, and had even paid life as the price of glory, while to me the greater good was offered at the expense of the less evil, as merely by incurring blindness, I might satisfy the most honourable demand of duty; which, intrinsically of more worth even than glory itself, ought to be the first and dearest object of every man's regard; I determined to dedicate the short enjoyment of my eye-sight, with as much effect as I could to the public advantage."

Among the attentions paid to Milton at this time, he was particularly pleased with those of Leonard Philarus, a learned Athenian, who had attained to high rank in Italy, and was now employed by the duke of Parma on an embassy to the court of Paris. Struck with the ability and spirit of Milton's composition, this illustrious Greek sent him his portrait, with a letter of panegyric to the defender of the English commonwealth. On a visit which Philarus soon afterwards made to England, he waited upon Milton, then reduced to a state of total blindness, and mutual friendship was the consequence of their personal intimacy. When Philarus returned to Paris, he was led, by the celebrity of Thevenot, the physician, particularly renowned at that time for his acquaintance with the diseases of the eye, to communicate a hope to Milton of the recovery of his sight. The letters in which our author acknowledges the kindness of his friend on this and other occasions are preserved in Dr. Symmons' life of him.

His intellectual powers, however, suffered no diminution from this abridgment of the sensitive faculties, and he pursued, without intermission, both his official and controversial employments. In 1652 a book was published at the Hague, entitled "Regii sanguinis clamor ad cælum adversus parricidas Anglicanos;" the author was Peter Moulin the younger. Milton replied to it in his "Second Defence," to which we have already referred, and which was entitled "Defensio secunda pro Populo Anglicano." In this was a high panegyric upon Cromwell, who had now assumed the supreme power with the title of Protector. "Milton's subservience and attachment to this usurper," says one of his biographers, "is the part of his conduct which it is the most difficult to justify. When the wisest and most conscientious of the republicans had become sensible of his arts, and had openly opposed his ambitious projects, it might have been expected that the mind of Milton would neither have been blinded by his hypocrisy, nor overawed by his power. If the general tenour of his character will exonerate him from the suspicion of interested motives on this occasion, it must be supposed that he was dazzled with the greatness of Cromwell's actions,

and was convinced that his superiority alone could allay that contention of parties which threatened ruin to the cause that had proved victorious in the field. Milton, besides, was a zealous friend to religious liberty, for which he saw no refuge from the intolerance of the Presbyterians, except in the moderation of the protector. It may be added, that the very passage in which he addresses Cromwell with the loftiest encomium, contains a free and noble exhortation, that he should respect that public liberty, of which he considers him as the guardian."

Milton's office as Latin secretary, chiefly regarded transactions with foreign nations, in which it is admitted that Cromwell was meritoriously attentive to the honour and interest of his own. In 1652 he lost his wife, and his blindness, in a short time, induced him to marry again. His second wife was Catharine, the daughter of captain Woodcock of Hackney, who, unfortunately for him, died within a year in child-bed, greatly regretted by her husband, who has consecrated her memory by a beautiful sonnet, supposed to be the result of a dream, immediately after her decease, in which are the following lines:

Methought I saw my late espoused saint,

* * * * *

Came, vested all in white, pure as her mind:

Her face was veiled, yet to my fancied sight

Love, sweetness, goodness in her person shined

So clear, as in no face with more delight.

But Oh! as to embrace me she inclined,

I waked;—she fled, and day brought back my night.

Employment was his resource against the gloom of his condition; and after he had concluded his controversial warfare, he took up his suspended "History of England," which he carried on to the conquest: he also collected materials for a Latin Thesaurus, intended as an improvement upon that of R. Stephanus.

In the business of his office he had coadjutors; but the most important matters were still committed to him, and from his pen proceeded a Latin memorial of great strength and elegance, stating the reasons for the war which the protector declared against Spain. A remonstrance which he drew up concerning the persecution of the Protestants in Savoy, strongly expressed his detestation of religious tyranny.

After the death of Cromwell, when the fluctuations of government threatened general anarchy, he was induced to give his advice on civil and ecclesiastical topics in some small publications, one of which was entitled "A Ready and Easy Way to establish a Free Commonwealth, and the Excellence thereof, compared with the Inconveniences and Dangers of re-admitting Kingship." This, as its title imports, was intended rather to expose the evils necessarily consequent to the nation's relapse into its old vassalage under kings, and to demonstrate the preference of a republican to a monarchical government, than to propose any just model of a popular constitution. In this work, as well as in another, entitled "Brief Delineations, &c." he shews that he was fearful of an unqualified appeal to the people, and deems them incapable of determining with wisdom for their own interests. It was, however, in vain to contend by pamphlets against the national inclination. The king returned in triumph, and Milton was discharged from his office, and for a time lay concealed in the house of a friend in St. Bartholomew's Close, near Smithfield. Here his privacy from the world was perfect, till after the passing of the act of oblivion, in the exceptions of which he was not comprehended, ascer-

tained

tained his safety, and re-inflated him in society. To whom he was indebted, in this emergency, for his preservation, is not known with certainty; but it seems probable that his life was saved principally by the earnest and grateful interposition of sir William D'Avenant, who had himself been formerly preserved by the mediation of Milton, when ordered by parliament, in 1651, to trial, before the high court of justice. (See D'AVENANT, WILLIAM.) Milton's name first occurs in the proceedings of the new government, in an address from the house of commons to his majesty, that he would issue his proclamation to call in Milton's "Defences of the People," and "Iconoclastes," together with a book of Goodwyn's, and cause them to be burnt by the common hangman, and also that the authors should be prosecuted by the attorney-general. The books were accordingly burnt, but the authors were returned as having absconded.

Now, reduced in his circumstances, and under the discountenance of power, Milton removed to a private habitation, near his former residence in the city. But scarcely had he left his concealment when he was taken into custody, by an order of the house of commons, from which he was dismissed by paying his fees. In 1662, he was residing in Jewin-street, and from thence he removed to a small house in the Artillery-Walk, adjoining Bunhill Fields, where he continued during the remaining part of his life.

While living in Jewin-street, he married his third wife, Elizabeth Minshull, the daughter of a gentleman of Cheshire. He was now to resume that poetical character which, for many years, had been sunk in that of the controversialist and politician. Undisturbed by contentions and temporary topics, his powerful mind was left in repose, to meditate upon the great ideas which had indistinctly risen to its view, and the result of its energies was the "Paradise Lost." Much discussion has taken place concerning the original conception of this grand performance, but hitherto it has not been traced. It is certain that at the time when he first formed the resolution of writing an epic poem, which was at an early period, he thought of some subject in the heroic times of English history; but the religious turn of his mind, and his assiduous study of the Hebrew scriptures, produced a final preference of a story derived from the Old Testament. He composed in blank verse, on account of the facility with which he could pour forth the strains that rushed into his mind with the force and rapidity of inspiration. His nephew Philips had the perusal of it, from the very beginning, in parcels of ten, twenty, or thirty verses at a time, which, being written by any person that was near at hand, probably wanted correction as to the orthography and pointing. This gentleman says, upon the authority of Milton, that his vein never happily flowed but from the autumnal equinox to the vernal, and that whatever he attempted at other times was never to his satisfaction. The exact time occupied in the composition of the *Paradise Lost* is not known; it was finished in 1665, when Milton, to avoid the contagion of the plague, through the kindness of his friend Elwood, a quaker, made a retreat to Chalfont, in Buckinghamshire. It was first printed in 1667, in ten books, and he received from the bookseller five pounds for the copyright, with a contingency of ten more, depending on the sale of two other editions, and which he lived to receive. These fifteen pounds, however, purchased only the bookseller's right to the several editions for which they were paid, as Milton's widow sold the irrevocable copyright of the work which had been bequeathed to her, for eight pounds, to the same bookseller, Samuel Simmons, who, almost immediately, disposed of what was thus wholly transferred to him, for twenty-five pounds to Aylmer, another bookseller, from whom it passed, at a con-

siderable advance, to Jacob Tonson. Much has been said of the deplorably low price advanced for this immortal work, "but," says Dr. Symonds, "if we would regard ourselves placed in the middle of the seventeenth century, and immersed in all the party violence of that miserable period, we should rather be inclined to wonder at the venturous liberality of the bookseller, who would give even this small consideration for the poem of a man living under the heaviest frown of the times, in whom the poet had long been forgotten in the polemic, and who now tendered an experiment in verse, of which it was impossible that the purchaser should be able to appreciate the value, or should not be suspicious of the danger. It is certain that the world was, at that period, incapable of doing it justice, and it was long before it took a secure place among those productions which continually rise in estimation, and are unlimited by time or place. Milton, conscious of its merits, anticipated his final success, and was, in that expectation, supported amidst temporary discouragements." The thirteenth edition was printed, with a life by the author, in 1727, by Elisha Fenton, who was a scholar, a poet, and a man of worth, though not without his failings. See FENTON.

In 1671 Milton published his "*Paradise Regained*," written upon the suggestion of his friend Elwood, who, on having read the *Paradise Lost* in manuscript, and being asked by the author how he liked it, answered, in his quaint way, "Thou hast said much here on *Paradise Lost*; but what hast thou to say of *Paradise Found*?" When the latter poem was finished, he put it into the hands of Elwood, saying, in a pleasant tone, "this is owing to you, for you put it into my head by the question you put to me at Chalfont." This was probably regarded by the author as the theological completion of the plan commenced in *Paradise Lost*, and he viewed it with the partial fondness of an aged parent for his latest offspring. But in point of grandeur and invention its inferiority is extremely apparent, yet modern criticism has pronounced it by no means unworthy of the genius of Milton, allowance being made for the narrow compass of the subject, and his particular purpose in writing it.

At the same time that this was published, appeared his tragedy of "*Sampson Agonistes*," composed upon the ancient model, and never intended for the stage. It cannot be said to entitle the author to a place among those dramatic writers who have distinguished themselves by the talent of moving the passions, or of delineating the character; but its moral and descriptive beauties are not inconsiderable. The impression made on the author's mind by the sufferings of his party, and by his own depressed state, may be distinctly traced in some of its pathetic and animated strains, such as in those that follow:

"God of our fathers! what is man!
That thou towards him with hand so various
Or, might I say, contrarious,
Temper'st thy providence through his short course
Not evenly, as thou rulest
The angelic orders, and inferior creatures mute,
Irrational and brute.
Nor do I name of men the common rout,
That wand'ring loose about
Grow up and perish, as a summer fly.
Heads without name, no more remembered;
But such as thou hast solemnly elected,
With gifts and graces eminently adorned,
To some great work, thy glory,
And people's safety, which in part they effect:

MILTON.

Yet towards these, thus dignified, thou oft
Amidst their height of noon,
Chang'’t thy countenance and thy hand, with no regard
Of highest favours past
From thee on them, or them to thee of service.
Not only dost thou degrade them, or remit
To life obscured, which were a fair dismissal,
But throw’st them lower than thou didst exalt them high.”

With the Sampson Agonistes Milton’s poetical account closes; but writing was become so much a habit with him, that he was continually making additions to his works in prose. In 1672 he published “A System of Logic, after the Manner of Ramus;” and in the following year he ventured again in the field of polemics, with “A Treatise of true Religion, &c. and the best Means to prevent the Growth of Popery.” The latter was become the dread of the nation, and Milton was among the most zealous of its opponents. The principle of toleration which he lays down is agreement in the sufficiency of the scriptures; and he denies it to the Papists, because they appeal to another authority. So imperfect was Milton’s notion of religious liberty: it is, however, to his credit, that even in this he was contending with popery, avowedly patronized by the duke of York, and secretly countenanced by the king. “The danger,” says his biographer, “which at this instant awakened the fears of Milton, became not long afterward so palpable and striking as to excite the nation, united in one great effort for its safety, to depose the Catholic bigot who occupied and abused the throne.”

In the same year Milton published a second edition of his youthful poems, with his “Tractate on Education,” in one volume, in which he included some pieces not comprehended in the edition of 1645. In 1674 he gave the world his familiar letters and some college exercises, the former with the title of “Epistolarum Familiarum Liber unus,” and the latter with that of “Prolusiones quedam oratoriz in Collegio Christi habitæ.” The next exercise of his pen, was, it is said, to translate into English the declaration of the Poles, on their elevating John Sobieski to their elective throne, but Dr. Symmons is doubtful of the fact; thinking it much more certain that in some part of the same year he wrote “A brief History of Muscovy,” which was published at a period of about eight years after his death. With this work terminated his literary labours; for the gout, which had for many years afflicted him, was now appointed to terminate his valuable life. He sunk tranquilly under an exhaustion of the vital powers on the eighth of November, 1674, when he had nearly completed his sixty-sixth year. His remains were carried from his house in Bunhill Fields to the church of St. Giles, Cripplegate, with a numerous and splendid attendance, and deposited in the chancel near those of his father. No monument marked the tomb of this great man, but one was erected to his memory in Westminster Abbey, in 1737, at the expence of Mr. Benson, one of the auditors of the impress. His bust has since been placed in the church where he was interred, by the late Samuel Whitbread, esq.

In the July preceding his death, Milton had requested the attendance of his brother Christopher, and in his presence made a disposition of his property by a formal declaration of his will. This mode of testament, which is called *nuncupative*, was set aside, on a suit instituted by his daughters. By this nuncupative will he had given all his property to his widow, assigning nothing to his daughters, but their mother’s portion, which had not yet been paid. On this account, and from exacting from his children some irksome

services, such as reading to him in languages which they did not understand, which were necessities resulting from his blindness and his indigence, he has been branded as an unkind father. But the nuncupative will, discovered some years since, shews him to have been amiable, and injured in that private scene, in which alone he has generally been considered as liable to censure, or rather, perhaps, as not entitled to affection. In this will, published by Mr. Warton, and in the papers connected with it, we find the venerable parent complaining of “unkind children,” as he calls them, for leaving and neglecting him because he was blind, and we see him compelled, by their injurious conduct, to appeal against them even to his servants. By the deposition of one of those servants, it is certain, that his complaints were not extorted by slight wrongs, or uttered by capricious passion on trivial provocations: that his children, with the exception of the youngest, would occasionally sell his books to the dunghill women, as the witness calls them. That these daughters were capable of combining with the maid-servant, and of advising her to cheat her master, and their father, in her marketings; and that one of them, Mary, on being told that her father was married, replied, “that was no news; but if she could hear of his death that would be something.”

We cannot better conclude our account of Milton than in the words of his liberal and eloquent biographer, Dr. Symmons, to whose work we have already acknowledged our obligations, and to which we earnestly refer the readers of the New Cyclopedia, in order that they may see how much more is recorded of our illustrious countryman, than can possibly be compressed in this article. Milton, says Dr. Symmons, was “a man in whom were illustriously combined all the qualities that could adorn, or elevate the nature to which he belonged; a man, who at once possessed beauty of countenance, symmetry of form, elegance of manners, benevolence of temper, magnanimity and loftiness of soul, the brightest illumination of intellect, knowledge the most various and extended, virtue that never loitered in her career nor deviated from her course;—a man who, if he had been delegated as a representative of his species to one of the superior worlds, would have suggested a grand idea of the human race, as of beings affluent with moral and intellectual treasure, who were raised and distinguished in the universe as the favourites and heirs of heaven.”

Of the three daughters of Milton, Anne, the eldest, married a master-builder, and died with her first child in her lying-in. Mary, the second, died in a single state: and Deborah, the youngest, married Abraham Clarke, a weaver in Spitalfields. She had seven sons and three daughters, but of these she left, at her decease, only Caleb, who marrying in the East Indies, had two sons whose history cannot be traced; and Elizabeth, who married Thomas Foster, of the same business with her father, and had by him three sons and four daughters, who all died young and without issue. Mrs. Foster died in poverty and distress, on the ninth of May, 1754, “and with her, it is highly probable, expired the last descendant of the immortal Milton.” Symmons’s Life of Milton. Biog. Brit. Gen. Biog. Bayle’s Dict. Newton’s Life of Milton, and Milton’s Works.

MILTON, in *Geography*, a parish in the lower half hundred of Toltingtrough, lathe of Aylesford, and county of Kent, England, is situated 22 miles from London, and forms the east side of the town of Gravesend, with which it was incorporated in the reign of queen Elizabeth. Milton was returned, under the population act of 1801, as containing 322 houses, occupied by 2056 inhabitants. The church, which stands near the sea-shore, about a mile from Gravesend,

end, is built of flints and rag-stones round it formerly stood the village of Milton, of which only one house is now left. See GRAVESEND.

MILTON, or *Middletun*, as anciently called, a market town and parish in the upper half hundred of Milton, in the lath of Seray, and county of Kent, England, is of very remote antiquity, and formed part of the demesnes of the Saxon kings. It is situated 12 miles from Maidstone, and 30 from London, on the acclivity of a hill, about half a mile from the high road, sloping down to a small creek which falls into the river Swale, about two miles to the north-west. The vicinity of this town to the Swale, which separates the Isle of Sheppey from the main land, was the cause of its being frequently plundered by the Danes during their piratical incursions in the ninth century. Here their veteran chief, Hasting, endeavoured to establish himself in the time of Alfred; and the remains of his encampment or fortrefs are still to be seen in the marshes of Kemsey Downs, between Milton church and the mouth of the creek. It consists of a high rampart and broad ditch, enclosing a square area, the sides of which are nearly parallel with the cardinal points of the compass. It measures about an hundred feet each way, and has obtained the name of Cattle-Rough, from its having been long overgrown with trees and underwood.

Milton is supposed to have originally stood in the vicinity of its church, which is considerably to the north of the present town; and near it the Saxon kings had a palace, which was burnt, together with the town, by earl Godwyn, during his quarrel with Edward the Confessor, about the year 1052. Notwithstanding this, Milton appears to have been a place of considerable importance for the time, in the days of William the Conqueror, who, in the Domesday survey, is recorded to have then held the manor. It remained vested in the crown till the time of Charles I., though frequently granted for life, or a term of years, to different persons; particularly to several queens in dowry, and others of the royal blood, who procured various privileges for the inhabitants. The grant of the market, which is kept on Saturdays, was obtained by queen Isabella, in the 13th of Edward II., together with the liberty of holding an annual fair for four days. The town is governed by a portreeve, who is chosen on St. James's day, by such inhabitants of the parish as pay the church and poor's rates. The market-house and shambles stand near the middle of the town; and at a small distance northward is the court-house, an old timber building, where manor courts and other public meetings are held; beneath it is the town gaol. The church is a spacious fabric, and consists of two aisles and two chancels, with a massive embattled tower at the west end, which, together with the south chancel, is composed of squared flints, laid in even rows. The east windows are large, and pointed; that of the north chancel is divided into five lights, with numerous crockets above; the other has four trefoil-headed lights below, with three ranges of quatrefoil lights above. The south chancel, which belonged to the ancient family of Northwood, contains a piscina, and several tombs and sepulchral memorials.

The number of houses in this parish, as returned in the year 1801, under the population act, was 322; that of inhabitants 2056. The Oyster Fishery furnishes the principal source of employment to the latter, and has done so for many centuries. In the reign of king John, the right of this fishery in the manor and hundred of Milton was granted to the abbey at Faversham, to which it appertained at the dissolution. It then was held by the crown till the reign of Charles I.: since that period it has been

granted, with the manor, to various persons successively; and is now held on lease by a company called Free Dredgers, who are governed by their own particular rules or bye-laws, made, according to ancient custom, at the court-baron of the manor. The oysters produced within the limits of this fishery are in high estimation, under the name of "Native Miltons." There are four wharfs belonging to this town; and considerable quantities of corn, and other produce of the adjacent country are shipped here for the London markets, commodities of every kind being freighted in return.

In the western part of this parish and its vicinity is a large tract of woodland, called Chestnut Woods, from the great plenty of those trees which grow therein: and in a presentment made of the customs of Milton, in 1575, it is mentioned, that the occupiers of three mills holden of the manor, should gather yearly for the lord of it nine bushels of "chellenottes" in Chestnut Wood, or pay eighteen-pence by the year to the queen.

In the marshes in the north-west quarter of the parish is a decoy for wild fowl, of which great numbers are taken, and principally sold in the markets of the metropolis. Halled's History of Kent, vol. vi. Beauties of England and Wales, vol. viii. by E. W. Brayley.

MILTON, a township of America, in Chittenden county, New York, on the E. side of lake Champlain, opposite to South Hero island; divided into nearly equal parts by La Moille river, which discharges itself into the lake in Colchester. The township contains 786 inhabitants.—Also, the "Uncataquisset" or "Unquaty" of the ancient Indians, a post-town in Norfolk county, Massachusetts, adjoining to Dorchester; 7 miles S. of Boston: containing 1143 inhabitants, three paper-mills, and a chocolate-mill. It was incorporated in 1662; and affords one of the finest prospects in America.—Also, a town in the county of Saratoga, in New York, containing 2123 inhabitants.—Also, a post-town in Cayuga county, New York, on the N.E. side of Cayuga lake, 40 miles N. of Tioga river; incorporated in 1794, and containing 3553 inhabitants.—Also, a small post-town in Albemarle county, Virginia, on the S.W. side of the Rivanna, about 80 miles N.W. by W. of Richmond.—Also, a post-town of Northumberland county, Pennsylvania: 219 miles from Washington.

MILTOWN-MALBAY, a post-town of Ireland, in the county of Clare. It is built on a bank running down to the sea, facing the south-west. There are here hot and cold baths, and it is much frequented as a bathing-place. It is 128 miles W.S.W. from Dub'in. Carlisle. Wakefield.

MILTSCHIN, a town of Bohemia, in the circle of Bechin; 10 miles N. of Tabor.

MILTUS, in *Betany*, so called by Loureiro, from *μύθος*, red lead, or vermilion, the whole plant being as that author says of a beautifully vivid red colour.—Loureir. Cochinch. 303.—Cials and order, *Dodiceandria Pentagynia*. Nat. Ord. *Caryophyllei*; Linn.? *Ficoideæ*, Juss.?

Gen. Ch. *Cal.* Perianth inferior, of five, ovate, concave, rugose, coloured, spreading, permanent segments. *Cor.* none. Nectary none. *Stam.* Filaments twelve, affixed to the bottom of the calyx, and shorter than it; anthers ovate, twin, erect. *Pist.* Germen superior, roundish, furrowed; style none; stigmas five, linear, bent backwards. *Peric.* Capsules five, approaching each other, ovate, rough, single-seeded. *Seed* ovate, shining.

Ess. Ch. Calyx of five leaves, inferior. Corolla none. Capsules five, single-seeded.

Obs. Loureiro remarks that the difference between this genus and *Glinus* is not very great.

1. *M. africana*. Loureir.—A native of dry places at Mozam-

Mozambique, an African island.—All that we know of this plant is from the description of the above quoted author, which is as follows. *Stem* shrubby, much divided, about four feet long, slender, prostrate, smooth. *Leaves* oblong, entire, obtuse, thick or fleshy, smooth, the lesser ones nearly sessile, opposite, and crowded. *Flower-stalks* simple, many together, lateral.—The stems, flowers, and leaves are all of a remarkably striking red or vernilion colour.

MILVAGO, in *Ichthyology*, a name given by Gesner and some others, to a fish called by authors in general *milvus*, and by some *lucerna*, and the *flying-fish*. It is a species of the trigla, and is called, by Artedi, the trigla with a snout bifid at the extremity, and the side-lines forked near the tail.

MILVERTON, in *Geography*, a market-town in the hundred of the same name, and county of Somerset, England. It is situated in a woody fertile country, pleasingly diversified with hill and valley, at the distance of eight miles from Taunton, and five from Wellington. The buildings are chiefly arranged in three irregular streets; and the church stands on an eminence in the centre. This town was anciently a borough, the manor whereof is now vested in the crown, and long possessed a good trade in ferges and druggets. The manufacture of these articles, however, is now almost entirely dropped, but an extensive manufactory of flannels has been established of late years. Though entirely deprived of its privileges as a borough, it continues to be governed by a portreeve; and searchers and sealers are still annually appointed. The petty sessions are held here. Friday is the market day, and there are two fairs during the year, one on the 25th of July, and another on the 10th of October. The population of the town and parish, according to the returns of 1801, was 1667 persons.

Milverton is remarkable in history as having given name to John de Milverton, the Carmelite friar of Bristol, who was celebrated for his zealous opposition to the doctrines of Wickliff, the first English reformer. Collinson's *History and Antiquities of Somersetshire*, vol. iii. 4to.

MILUS, *μῖλος*, a name given by the Greek writers to a plant used in garlands, and sometimes to a tree. Theophrastus evidently uses it as the name of a tree, and Crato as that of the garland-herb.

MILVUS, in *Ichthyology*. See *FLYING-FISH*, *CALYONIMUS Lyræ*, and *DRAGONET*.

MILVUS, in *Ornithology*, the name of the kite and buzzard. See *FALCO*.

MILWALDE, or MIDWALDE, in *Geography*, a town of Holland, in the department of Groningen; 8 miles S.S.E. of Dam.

MIMA, a town of Japan, in the island of Xicoco; 23 miles N.W. of Awa.

MIMANSA, in *Philosophy*, is the name of a theory upheld by a numerous sect of Hindoos, among whom, however, even of this school, there is considerable diversity of opinion. The word Mimanfa denotes, in Sanscrit, the operations and conclusions of reason. The doctrines are divided into the first and second. The first, called Purva Mimanfa, or Karma Mimanfa, is said to have been promulgated by Jaimini in twelve chapters; it discusses questions of law, and moral and religious duties. (See *JAIMINI*.) The second division is called Vedanta, and is attributed to Vyasa, who is sometimes said to have been the master or preceptor of Jaimini. (See *VEDANTA* and *VYASA*; and the articles *MURTY* and *MYSTICAL Poetry* for some of the tenets of the Vedanti school.) Both the Mimanfas profess to shew what acts are pure or impure, what objects are to be desired or avoided, and by what means the soul may ascend to the First

Principle. Compared with the Grecian schools, the Mimanfa approaches nearest the Platonic, having, indeed, many consonant ideas and doctrines.

MIME. MIMUS, a term in the ancient comedy, signifying a *buffoon*, or *mimic*, who acted by postures suitable to the person or subject he represented.

The word comes from the Greek *μιμῶν*, *imitator*; formed of *μιμῶμαι*, *I imitate*. The same comedians were also sometimes called *pantomimes*, because of their counterfeiting all manner of postures and gestures.

According to Lucian (de Saltatione), a single dancer, or mime, was able to express all the incidents and sentiments of a whole tragedy or epic poem by dumb signs, but still to music, as in the ancient recitation, and in modern pantomime entertainments; though Aristotle expressly says, that dancers want neither poetry nor music; as by the assistance of measure and cadence only, they can imitate human manners, actions, and passions. See *BATHYLLUS* and *Pylades*.

Plutarch (Sympos. l. vii. probl. 8.) distinguishes two kinds of pantomime: one was called *εὐβήσιον*, the subject of which was decent and decorous, as well as the manner of expressing it, and this nearly approached to comedy. Buffoonery and indecency constituted the other.

Sophon of Syracuse, who flourished in the time of Xerxes, was reputed the inventor of serious and decorous pantomime, replete with lessons of morality. Plato had great pleasure in the perusal of the pantomimes of this author. But the Greek drama was scarcely formed, ere theatrical writers and actors endeavoured more to divert the people by farces and representations of vicious scenes and characters, than to improve their morals. Such were the means by which interludes on the stage were rendered agreeable to the people of Greece.

The Romans were equally pleased with pantomime, and formed of it a fourth species of drama. The actors distinguished themselves by a licentious imitation of the manners of the times, as appears by the following verse of Ovid.

“Scribere si fas est imitantes turpia Mimos.”

The mimes usually acted without socks or stockings, whereas the three others wore socks or buskins. Their heads were close shaved, like the fools on mountebank stages; their dress, like that of our harlequins, was composed of bits of cloth or linen of different colours. This dress was called *Panniculus centumculus*. They sometimes also appeared in magnificent senatorial robes of purple, to divert the people by the ridicule and contrail of a senator's robe, and a shaved head and socks. Thus harlequin sometimes on our stage is bedight in the garb of a gentleman. To this dress they joined licentious language, and all kinds of ridiculous postures, neglecting nothing that could amuse the populace.

This kind of diversion was given even at funerals, and the actors were called *Archimimes*. They went before the coffin, and described by their gestures the actions and manners of the deceased: his virtues and vices, all were exhibited. The propensity which the mimes had to raillery, inclined them rather to reveal their frailties, than paint their virtues, or any thing that could redound to their honour.

The applause given to the pieces of Plautus and Terence, did not prevent even the better sort from admiring these pantomimic farces, when enlivened by wit, and not debased by indecency. The Mimographic poets of the Romans, who chiefly distinguished themselves in these dramatic exhibitions, were Sænius Mattius, Decimus Liborius, Publius Syrus, under Julius Cæsar; Philistion, under Augustus; Silo, under Tiberius; Virgilius Romanus, under Trajan;

and Marcus Marcellus, under Antoninus. But the most celebrated of all these was Decimus Liberius, and Publius Syrus. The first directed Julius Cæsar so much that he made him a Roman Knight, and conferred on him the privilege of wearing gold rings. He had such a wonderful talent at teasing ridicule, as to make every one draw his abilities. To the Cæsar allude, in writing to Trebatius, when he was in Britain with Julius Cæsar, telling him, that "if he is absent much longer inactive, he must expect to be attacked by the name Liberius." Publius Syrus, however, gained so much more applause, that he retired to Puzzoli, where he comforted himself for his disgrace and the inconsistency of the people, and the transient state of human affairs, by the following admirable verse :

"Cecidi ego : vadet qui sequitur ; laus est publica."

We with difficulty can imagine some of the grave and judicious reflections of Syrus to be extracted from the pantomimes which he exhibited on the stage : we should rather take them for maxims moulded on the sock or buskin. *Eneycl. 1st edit.*

"Sweet Polhymnia, see advance,
Mother of the graceful dance :
She who taught th' ingenious art
Silent language to impart :
Signs for sentiment she found,
Eloquence without a sound :
Hands loquacious gave her lungs,
All her limbs are speaking tongues."

MIMESIS, μιμησις, in *Rhetoric*, a figure, whereby the words, gestures, speech, actions, &c. of another person are imitated. See IMITATION.

MIMEPES, in *Botany*, so called by Mr. Salisbury (according to Mr. Brown) ; apparently from μιμησις, a mimic, but we know not its particular application. *Brown Tr. of Linn. Soc. v. 10. 105. Aut. Hort. Kew. ed. 2. v. 1. 197. (Hypophyllocarpodendron ; Boerb. Lugd-Bat. ed. 2. v. 2. 205. t. 205, 206.)—Class and order, Tetrandria Monogynia. Nat. Ord. Proteas, Juss.*

Ess. Ch. Corolla regular, in four deep segments. Stamens in the concave tips of the segments. Nectary four scales beneath the germen. Nut superior, sessile, smooth. Common receptacle flat, many-flowered. Scales deciduous.

Eleven species of this genus, all from the Cape of Good Hope, are described by Mr. Brown, four of which, introduced by Mr. Masson between the years 1774 and 1795, are cultivated at Kew. They are all *shrubs*, of a stout tortuous habit ; their *leaves* either entire, or furnished with callous teeth. *Flowers* aggregate, generally axillary, sometimes embraced by a sort of hooded leaf, sometimes terminal. *Involucrum* of many imbricated, membranous, rarely coriaceous, leaves, sometimes turned all to one side. *Pistils* longer than the corolla, which becomes laccid after its expansion. *Stigma* cylindrical, slender, for the most part acute. In *M. capitulata* however, Mr. Brown's second species, it is thickened and conical at the summit. In *M. purpurea*, his last, the *receptacle* is destitute of scales.

The following examples are sufficient.

M. hirta. Hairy Mimetes. Br. n. 1. (*Protea hirta ; Linn. Mant. 188. Lepidocarpodendron foliis sericeis brevibus, confertillimè natis ; fructu gracili longo ; Boerb. Lugd-Bat. v. 2. 194. t. 194. Leucadendron hirtum ; Linn. Sp. Pl. 136.*)—*Involucrum* equilateral, coloured, pointed, eight or ten-flowered. *Stigma* awl-shaped. *Corolla* feathery. *Leaves* acute, entire.—Grows in moist

situations. *Flowers* in the greenish use from June to August. A woody *shrub*, with numerous, imbricated, silky *leaves*. *Flowers* red-lith.

M. cucullata. Three-toothed Mimetes. Br. n. 4. (*Protea cucullata ; Linn. Mant. 189. Leuca enlroa africana, five Scolymocephalus angulorolatus, spicibus tridentatis ; Pluk. Almagell. 212. t. 3. 4. f. 6. Hypophylla arpodendron ; Boerb. Lugd-Bat. 206. t. 206. Leucadendron cucullatum ; Linn. Sp. Pl. 136.*)—*Involucrum* unequally directed, pointed, nearly smooth. *Leaves* linear-oblong, three-toothed, smooth : the floral ones dilated below, with recurved margins. *Stigma* awl-shaped, very acute.—Native of low marshy places, a mile and a half from the Cape. The *leaves* are crowded, tipped with three blunt red teeth. *Flowers* leathery, their long prominent styles reaching far beyond the corolla.

M. thymelaeoides. Daphne-leaved Mimetes. Br. n. 8. (*Leucadendron thymelaeoides ; Berg. Cap. 1.*)—*Stem* erect. *Leaves* oval, obtuse, downy, small. *Flowers* terminal, rather clustered. *Style* downy below the middle.—*Stem* shrubby, with round, purplish, downy, upright, compound branches. *Leaves* about half an inch long, crowded, spreading, downy, finely tinged ; the lower ones becoming smooth. *Flowers* sessile, the size of a small cherry, mostly in pans. *Leaves* of the *involucrum* elliptical, inclining to lanceolate. *Scales* of the *receptacle* all over densely woolly. *Corolla* silky. *Stigma* rather acute. Of this we find no figure, nor is any thing said of the colour of the flowers.

MIMIZAN, in *Geography*, a town of France, in the department of the Landes, and chief place of a canton, in the district of Mont-de-Marsan. The place contains 413, and the canton 2821 inhabitants, on a territory of 415 kilometres, in 6 communes.

MIMNERMUS, in *Biography*, a Greek elegiac poet, a native of Colophon, who flourished in the sixth century before Christ, was contemporary with Solon. He was the inventor of the pentameter verse : his compositions were of the elegiac kind, according to the ancient acceptation of the word, which by no means confined it to mournful topics. His talents led him to treat of very different subjects : he was a votary of love and pleasure, and is so distinguished by a line in Propertius :

"Plus in amore valet Mimnermi versus Homero :"

Horace likewise refers to him in a similar connection, though in much stronger terms :

"Si, Mimnermus uti censet, sine amore jocisque
Nil est jocundum, vivas in amore jocisque."

"If, as wise Mimnermus said,
Life unblest with love and joy,
Ranks us with the senseless dead,
Let these gifts each hour employ."

His manners are thought to have corresponded with his philosophy. Of his poems only a few remain, which have been published with the "Novem Feminarum Græcarum Carmina," by Ursinus in 1568, and by Wolfius in 1734.

Mimnermus, according to Plutarch, has rendered himself remarkable, by playing upon the flute a nome called *Cradias*, which, Hesychius tells us, was an air for that instrument usually performed at Athens, during the march, or procession, of the victims of expiation. His elegies, of which only a few fragments are preserved, were so much admired in antiquity, that Horace preferred them to those of Callimachus. (*Epist. hb. ii. ep. ii. v. 101.*) He composed a poem of this kind, as we learn from Pausanias, upon the battle

battle fought between the people of Smyrna, and the Lydians, under Gyges. He likewise was author of a poem in elegiac verse, quoted by Strabo (lib. xiv. p. 633, 634. ed. Par.), which he entitled "Nanno," and in which we may suppose he chiefly celebrated a young and beautiful girl of that name, who, according to Athenæus, was a player on the flute, with whom he was enamoured in his old age. Horace bears testimony to his abilities in describing that seducing passion; alluding to some much admired lines of this Greek poet, which have been preserved by Stobæus:

" Τις δε βίος, τι δε τέρπον ατερ χρυσι; Ἀφροδίτης, &c.
 What is life and all its pride,
 If love and pleasure be denied?
 Snatch, snatch me hence, ye Fates, whene'er
 The au'rous blis I cease to share.
 Oh let us crop each fragrant flow'r,
 While youth and vigour give us pow'r;
 For frozen age will soon destroy
 The force to give or take a joy;
 And then a prey to pain and care,
 Detested by the young and fair,
 The sun's bleit beams will hateful grow,
 And only shine on scenes of woe!"

MIMOSA, in *Botany*, so called from *mimos*, an actor or imitator. *Herba, or arbor, mimosa*, meaning a sort of imitative plant, whose motions mimic the sensibility of animal life. The Sensitive Plant.—Linn. Gen. 548. Schreb. 734. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 438. Juss. 346. Tourn. t. 375. Lamarck Illustr. t. 846. Gærtn. t. 155. (Acacia; Tourn. t. 375. Inga; Plum. Gen. 13. t. 19.)—Class and order, *Polygamia Monoecia*. Nat. Ord. *Leguminosæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, very small, with five teeth. *Cor.* of one petal, funnel-shaped, regular, more or less deeply five-cleft, sometimes wanting. *Stam.* Filaments capillary, very long, usually very numerous, sometimes united below; anthers incumbent, sometimes partially abortive. *Pist.* Germen superior, oblong; style thread-shaped, shorter than the stamens; stigma abrupt. *Peric.* Legume long, with numerous transverse partitions. *Seeds* numerous, of various roundish shapes.

Obs. Many of the flowers are male, soon falling off; others are female; others furnished with both stamens and pistil, each occasionally more or less imperfect; all which circumstances vary in different species.

Mimosa of Tournefort has a jointed legume, and apparently sensitive, or irritable, leaves.

Acacia of the same author has a cylindrical legume; the leaves not moving when touched.

Inga of Plumier has a fleshy legume.

No part of the fructification in the genus before us is constant.

The *calyx*, usually five-toothed, in some species is three-cleft.

Corolla usually of one petal, in some is of five, in others altogether wanting.

Stamens in some very numerous, in others ten, five, or four; in some monadelphous; in some abortive.

Pericarp a legume, but in some species fleshy, in others membranous; in some winged, in others jointed; in some composed of four valves.

Seeds of a different shape in different species.

Ess. Ch. *Calyx* five-toothed. *Corolla* regular, five-cleft. *Stamens* five or more. *Pistil* one. *Legume* superior, with many cells. Some male flowers.

This vast genus labours under great uncertainty of cha-

rafter, as appears by the above remarks of Linnæus. For some of its near allies, see *GLEDITSIA* and *GYMNOCALADUS*. Jussieu has hinted at the propriety of dividing it, according to the number of stamens, and the structure of the legume. This Willdenow has attempted; but to accomplish it fully, an examination of numerous species in a living state would be necessary; and as most of them are tropical shrubs or trees, rarely seen, and still more rarely flowering or fruiting, in the gardens of Europe, this desirable end is not at present attainable. The foliage is of the pinnate kind, more or less compound; in some irritable, and folding up when touched or shaken; in all, we believe, drooping and folding together in the dark. A number of paradoxical species as to habit, uniform enough in fructification, have been found in the southern hemisphere. These have only a few pinnated leaves when young, bearing subsequently nothing but simple, vertical, oblong or linear, dilated and defoliated footstalks, which have all the appearance of leaves, and doubtless perform the functions of such. A few species bear, in their adult state, nothing but angular thorns, still less like foliage. Yet we know not of any difference in the fructification, between these and various uniformly pinnate kinds of *Mimosa*, found likewise in New Holland, which have the habit as well as characters of numerous species heretofore described, natives of Africa, or of the East or West Indies.

It is difficult to form a calculation of the species of *Mimosa*. The 14th edition of *Syst. Veg.* contains fifty-three only, scarcely any of the New Holland ones being there included. Of these last five are figured by Labillardiere, and several in Curtis and Andrews; two in Smith's Specimen of the Botany of New Holland. Much more information may be expected from Mr. Brown on this subject.

The genus is for the present subdivided, by the composition of its leaves, into several sections, of which we shall offer a few examples.—Some species are furnished with thorns, others not.—The roots in general have a strong alliaceous scent.

Section 1. Leaves simply pinnate.

M. Inga. Sweet-bean *Mimosa*. Linn. Sp. Pl. 1498. (*Inga* flore albo fimbriato, fructu dulci; Plum. Ic. 14. t. 25. *Arbor sylvestris*, Belgis *Zoete-boontjes*; Merian. Surin. 51. t. 51.)—Thorns none. Leaves pinnate, of five pair of ovate leaflets, with a jointed bordered stalk—Native of South America. A tree, with broad, smooth, serrated, ribbed leaflets. *Flowers* corymbose, large, green, with many united stamens. *Legumes* often a foot long, tortuous and furrowed; the seeds lodged in sweet eatable pulp. The last circumstance shews an affinity to *Ceratonia*.

Section 2. Footstalk divided, bearing two or three distinct pair of leaves.

M. bigemina. Pointed Twin-leaved *Mimosa*. Linn. Sp. Pl. 1499. (Katou-Conna; Rheede Hort. Malab. v. 6. 21. t. 12.)—Thorns none. Leaves pointed, in a double pair.—Native of Malabar. A tall tree, with a fetid though insipid root. *Leaflets* ovate, entire, three inches long, smooth. *Flowers* small, white, monadelphous. *Legumes* spiral, compressed, their polished globose seeds suspended by a thread.

Section 3. Leaves conjugate, consisting of two pinnate leaves, or a common footstalk.

M. sensitiva. Broad-leaved Sensitive plant. Linn. Sp. Pl. 1501. (*M. spinosa prima*, &c.; Breyn. Cent. t. 16.)—Prickly. Leaves conjugate; each with two pair of half-ovate leaflets; the innermost lower one very small. Petals none.—Native of the Brasils; and of hedges at Lima. This very interesting plant, whose sensibility, on account of the large size of its leaflets, is so striking, was formerly introduced by Houston into the gardens of England, but is

no longer to be met with. We have seen it at Turin. The *footstalks* have a large succulent knot at their base, which appears the chief seat of irritability, and on which the *leaflets* turn, as on a hinge, at the slightest touch. The largest *leaflets* are near an inch and half long; all semi-ovate, bristly beneath. *Flowers* in globular dense heads, on simple axillary stalks. *Legumes* flat, radiating from a centre, bristly and downy.

M. pudica. Common Sensitive plant, or Humble plant. Linn. Sp. Pl. 1501. (*M. spinosa* *tertia*, &c.; Breyn. Cent. t. 18.)—Prickly. Leaves to somewhat fingered, pinnate. Stem hispid. Legumes jointed, fringed.—Native of South America, and of the title of Bourbon.—This is naturally shrubby, though raised as an annual in our stoves, where it is kept for the sake of its wonderful sensibility. The *leaflets* are very numerous, oblong, obliquely elliptical, rather bristly. If one of them be cut, the shock is communicated, with gradually accelerated rapidity, along the *footstalks*, to the rest, who all fold softly together, after which the common and partial stalks droop and become pendent. These have the same tumid pulpy texture at their base as the former. (See LEAVES.) The *flowers* are pale purple, in round, axillary, stalked tufts. *Legumes* near an inch long, composed of three or four orbicular fringed joints.

Section 4. Leaves at least doubly pinnate.

M. glauca. Glaucous Mimosa. Linn. Sp. Pl. 1504. (*Acacia* non *spinosa*, flore albo, foliorum pinnis latiusculis glabris, siliquis longis planis; Trew. Ehret. 9. t. 36.)—Thorns none. Leaves doubly pinnate, in six principal divisions, and very numerous partial ones. *Legumes* long, lanceolate, flat.—Native of South America. Cultivated in our stoves, from the time of king William. The delicate glaucous *foliage* is very handsome. *Flowers* white, decandrous, in globular stalked axillary heads, either solitary or in pairs. *Legumes* a span long, acute at each end.

M. farnesiana. Sweet-scented Yellow Mimosa. Linn. Sp. Pl. 1506. *Acacia indica farnesiana*; Ald. Hort. Farnes. 3. t. 2. 4.)—Spines in the place of stipulas, awl-shaped, distinct. Leaves doubly pinnate, in eight principal divisions, and numerous partial ones. *Legumes* tumid, curved.—Native of Hispaniola. First raised at Rome in 1611. It is scarcely now seen in our stoves. The *leaflets* are small and smooth. *Flowers* deep yellow, in stalked heads, (not sessile as Linnæus says,) valuable for their exquisite fragrance, which excels almost every thing of the kind.

M. nilotica. Egyptian Mimosa. Linn. Sp. Pl. 1506. Woodv. Med. Bot. t. 67.—Spines in the place of stipulas, needle-shaped, divaricated. Leaves doubly pinnate, with glands on their common stalk. Heads of flowers on downy stalks, several together.—Native of the Levant. Linnæus mistook this for the true Gum Arabic plant, whose legumes were pasted along with his specimens, and which is another species of *Mimosa*, not well known to us. At least this was the opinion of the late learned Mr. Dryander. Several species, akin to these, produce different sorts of Gum Arabic, or Gum Senegal.

M. pubescens. Hairy-stemmed Mimosa. Vent. Hort. Malm. t. 21. Curt. Mag. t. 1263.—Thorns none. Branches hairy. *Legumes* doubly pinnate, without glands. *Leaflets* numerous, crowded. Heads of flowers numerous, in long axillary clusters.—Native of New South Wales. A beautiful and fragrant acquisition to the conservatory, remarkable for its rich downy *foliage*, and copious golden *flowers*.

Of the New Holland species with denudated *footstalks*, assuming the aspect of simple leaves, and which make a fifth most distinct *section*, examples are

M. myrtifolia. Curt. Mag. t. 302.

M. strita. Ibid. t. 1121. Andr. Repos. t. 53.
Of those which bear spines only.

M. verticillata. Curt. Mag. t. 110.

MIMOSA, in Gardning, comprehends plants of the shrubby and under shrubby kinds, of which the species cultivated are, the double-flowered annual sensitive mimosa (*M. plena*); the lively mimosa (*M. viva*); the quadrivalve-podded humble mimosa (*M. quadrivalvis*); the sensitive plant (*M. sensitiva*); the humble plant (*M. pudica*); the long-twiggd mimosa (*M. virgata*); the spotted-stalked mimosa (*M. punctata*); the slothful mimosa (*M. pernambucana*); the hairy-podded mimosa (*M. alperata*); the slow American sensitive plant (*M. pigra*); the glaucous mimosa (*M. glauca*); the horned mimosa, or cuckold tree (*M. cornigera*); the horrid mimosa (*M. horrida*); the Farnesian mimosa, or sponge tree (*M. farnesiana*); the Egyptian mimosa (*M. nilotica*); the whorled-leaved mimosa (*M. verticillata*); the rough tree mimosa (*M. arborea*); the Lebbeck, or Egyptian mimosa (*M. lebbeck*); the broad-podded mimosa (*M. latifolia*); the tamarind-leaved American mimosa (*M. tamarindifolia*); the spiral mimosa (*M. circinalis*); the small-leaved mimosa (*M. pennata*); the broad-leaved mimosa (*M. latifolia*); the purple mimosa, or soldier wood (*M. purpurea*); the netted mimosa (*M. reticulata*); the climbing mimosa (*M. scandens*); the myrtle-leaved mimosa (*M. myrtifolia*); and the sweet-scented mimosa (*M. suaveolens*.)

Method of Culture.—These plants are all capable of being increased by seed, and some of the sensitive kinds by layers and cuttings, but the first is by much the best method. The seed procured from the nurseries or seed-shops should be sown in pots of light rich mould early in the spring, covering it with fine earth, a quarter of an inch deep, and plunging the pots in the hot-bed; if in a common hot-bed under frames and glasses, managing them nearly in the manner of tender annuals, and when in a bark-bed in the stove little trouble is required. But moderate sprinklings of water should be given; and when the plants are two or three inches high, they should be planted out singly into small pots, preserving the earth to their roots, replunging them in the hot-bed, &c. giving water and occasional shade till they are well rooted, repeating the waterings frequently. The plants should afterwards be continued either in the hot-bed under glasses, or plunged in the bark-bed of the stove, to facilitate their growth, preserve them in vigour, and increase the sensibility of the sensitive kinds; admitting fresh air pretty freely.

It is proper that the perennial sorts, both shrubby and herbaceous, should be kept in the stove all winter, and principally the year round. And they must be frequently removed into larger pots to prevent the roots from getting through the pots, which they are apt to do, and by that means are often destroyed.

The *Acacia* kinds are the most tender, requiring the stove almost constantly, except a little in the heat of summer, when they must be placed in a warm situation. They should always have a bark hot-bed, and be put in very small pots filled with sandy mould, the heat of the stove being kept up to above temperate: as the leaves of some of them are shed, they have the appearance of being dried when that is not the case.

Where there is not the convenience of a stove, those who are curious to have the plants, may have them in summer, by the aid of a common dung, or tan-bark hot-bed, under frames and glasses, though not in winter; by raising some of the annual, or any of the other kinds, by seed in spring, in a hot-bed under a frame, &c. keeping up the heat of the bed until the middle of June, and continuing the plants always

always under the frame, raising one end of the lights a little, occasionally, in warm days, to admit fresh air; and as they rise in height, raise the frame at bottom, to allow them full room to grow. About Midsummer, or soon after, some of the low spreading kinds may likewise be turned out with balls, or plunged in their pots into a warm sunny border, and covered with large hand-glasses, which may be lifted off occasionally just to view the plants. By these methods, the plants may be preserved through the summer in their sensitive quality, though not in equal perfection to those in stoves; nor can they be preserved alive in winter out of the stove.

The shrubby kinds that afford spreading branches may be laid any time in summer, in pots plunged in the bark-bed, where they then take root, and are ready to pot off singly in the autumnal season.

The sensitive and humble sorts often branch out profusely, so as to furnish plenty of young shoots for cuttings, which should be planted in pots in the summer season, plunging them in the bark-bed, whereby they often readily take root, and form good plants.

These modes should, however, only be practised when feed cannot be procured.

The general culture of all the species is afterwards to keep them always in pots placed in the stove, being plunged occasionally in the bark-bed, especially the spreading sensitive kinds, frequent waterings being given in summer and winter, but considerably the most in the summer season; shifting them into larger pots as they increase in growth. And although most of the sorts will live in the open air in the heat of summer, it is the best practice to expose them but sparingly.

The fourth and fifth sorts are held in high estimation on account of the singular sensibility lodged in their leaves; which, in consequence of being touched or shaken, either by the hand, a stick, or the least wind blowing upon them, the wings of the leaves suddenly close, and the footstalks fall down. The period of time which the leaves, &c. require to recover themselves, after falling from any irritation, are according to the vigour of the plant, the hour of the day, the serenity of the atmosphere, and the temperature of the heat of the stove, &c. being often from ten or fifteen minutes to an hour or more.

The plants also, every evening, naturally contract themselves, and expand again in the morning. They are all ornamental and curious in their nature.

MIMULUS, in *Botany*, a name borrowed from Pliny, whose plant however could not be the same with Linnæus's American genus. The word is derived from *Mimus*, a masked actor among the Romans, and alludes to the form of the corolla.—Linn. Gen. 323. Schreb. 423. Willd. Sp. Pl. v. 3. 360. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 2. 361. Juss. 122. Brown Prodr. Nov. Holl. v. 1. 439. Lamarck Illustr. t. 523. Gærtn. t. 53. (Cynorrhynchium; Mitch. 3.)—Clas and order, *Didymia Angiospermia*. Nat. Ord. *Personate*, Linn. *Scrophularia*, Juss. and Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, oblong, prismatic, five-sided, five-toothed, nearly equal, permanent. *Cor.* of one petal, ringent; tube the length of the calyx; limb two-lipped; the upper erect, cloven, rounded, reflexed at the sides; the lower broader, with three rounded segments, the middle one smallest; palate convex, cloven, protruded from the base of the lower lip. *Stam.* Filaments four, thread-shaped, within the throat, two of them shorter; anthers cloven, kidney-shaped. *Pist.* Germen superior, conical; style thread-shaped, the length of the stamens; stigma

ovate, cloven, compressed. *Peric.* Capsule oval, of two cells, opening transversely at the top; partition membranous, contrary to the valves. *Seeds* numerous, small. *Recept.* oblong, affixed to the partition on each side.

Eff. Ch. Calyx five-toothed, prismatic. Corolla ringent; the upper lip folded back at its sides. Capsule with two cells and many seeds.

1. *M. ringens*. Oblong-leaved Monkey-flower. Linn. Sp. Pl. 884. Curt. Mag. t. 283.—Stem erect. Leaves oblong, linear, sessile.—A native of Virginia and Canada, growing in wet places, and flowering in the summer.—*Root* perennial. *Stem* annual, about two-feet high, square, jointed, occasionally branched at the base. *Leaves* two at each joint of the stem, opposite, serrated, acutely pointed. *Flowers* solitary, on long, opposite stalks which spring from the joints of the upper part of the stem; they are of a delicate violet colour and without smell. *Seeds* pale straw-coloured, and tipped at each end, according to Gærtner, with a small, prominent, reddish point.—This plant was referred to several different genera by old authors. Linnæus first called it *Mimulus*, assigning the following explanation of the term in his *Philosophia Botanica*, “*MIMULUS, mimus personatus.*”

2. *M. glutinosus*. Orange Monkey-flower. Willd. n. 2. (*M. aurantiacus*; Curt. Mag. t. 354.)—Stem erect, shrubby, round. Leaves sessile, ovato-lanceolate, rather obtuse.—Gathered by Mr. Archibald Menzies in California. It flowers in our greenhouses, to which it is extremely ornamental, during the greatest part of the summer.—*Stem* nearly three feet high, much branched, jointed, viscid. *Leaves* opposite, sessile, serrated, much blunter than in the last species, revolute, smooth above, veiny. *Flowers* very showy, twice as large as those of *M. ringens*, of a beautiful orange colour, on solitary stalks, two at each joint of the stem. The whole plant is glutinous.

3. *M. alatus*. Oval-leaved Monkey-flower. Willd. n. 3. Vahl. Symb. p. 2. 72.—Stem erect, square, winged. Leaves oval, on stalks. A native of North America. It flowers at Kew in July and August.—We know of no figure of this plant, which very much resembles the first species in appearance.—*Stem* simple, smooth, slightly branched at the top, winged with a membrane at each angle. *Leaves* oval, veined, unequally serrated. *Flowers* on axillary, solitary, opposite, square stalks, swelling upwards. *Corolla* but little exceeding the calyx in length.

4. *M. luteus*. Yellow Monkey-flower. Linn. Sp. Pl. 884. Curt. Mag. t. 1501. (*Gratiola foliis subrotundi nervosis, floribus luteis*; Feuill. Peruv. v. 2. 745. t. 54.)—Stem creeping. Leaves roundish or ovate, on short stalks embracing the stem.—Found originally at Chili by Feuillé; and lately in California, and at Nootka, by Mr. Archibald Menzies. Dr. Langsdorff also, one of the Russian embassy to China, found it at one of the Fox Islands.—*Stems* creeping in the lower part, angular, thick at the base, the flowering branches ascending. *Leaves* opposite, at the joints of the stem. *Flowers* on solitary stalks, two at each joint, of a bright yellow colour, their throat spotted with red. The whole plant is massy and magnificent, being thickly set with foliage and flowers.

5. *M. gracilis*. Slender Monkey-flower. Brown Prodr. Nov. Holl. v. 1. 439.—Very smooth, erect. Leaves oblong, somewhat linear, obtuse, nearly entire. Flower-stalks elongated.—Found by Mr. R. Brown near Port Jackson, as well as in the tropical part of New Holland.

6. *M. repens*. Creeping Monkey-flower. Brown Prodr. Nov. Holl. v. 1. 439.—Smooth, creeping. Branches ascending. Leaves oval, obtuse. Flower-stalks shorter than the

the calyx.—Native of New South Wales and Van Diemen's Land. *Brown*.

MIMULUS, in *Gardening*, comprehends plants of the herbaceous flowery ornamental kind, of which the species cultivated are, the oblong leaved monkey-flower (*M. ruscus*); the wing stalked mimulus (*M. alatus*); and the orange monkey flower (*M. aurantiacus*).

M. of Culture.—This is a plant which is very hardy in respect to cold, but should have a loamy soft soil, rather moist than dry, and not too much exposed to the sun.

In the first sort the plants may be increased by parting the roots, not too small, and planting them in autumn, or the early spring, but the former is the better season. It may also be raised by seeds, which should be sown in autumn, soon after they become perfectly ripe, on a border exposed to the morning sun. And the second sort may likewise be increased in the same manner.

With respect to the third kind, it is best propagated by planting cuttings of the young shoots or branches in the early spring in pots of fresh mould, plunging them in a mild hot-bed, being afterwards managed as the other sorts.

The first and the second sort may be introduced in the borders and clumps, and the third among other potted plants of the less tender kinds.

MIMUSOPS, in *Botany*, so called by Linnæus, who seems to have taken the idea of the name from Hermann's *Museum Zeylanicum*, p. 23. This tree is there called *Munamal*, *Muna* being said to signify the human face in the Cingalese language, because the flowers have somewhat of the resemblance of a human face, of which however we seek in vain for any trace in the plates of authors. As this author says the highly fragrant flowers are worn by young women to adorn the neck and head, may not the above appellation allude to their being used as an ornament for the face?—Linn. Gen. 190. Schreb. 252. Willd. Sp. Pl. v. 2. 325. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. v. 2. 349. Brown Prodr. Nov. Holl. v. 1. 530. Juss. 152. Lamarck Illustr. t. 300. Gærtn. t. 42 (Imbricaria; Juss. 152. Binectaria; Forsk.)—Class and order, *Olandria Monegyia*. Nat. Ord. *Holoraceæ*, Linn. *Sapotæ*, Juss. and Brown.

Gen. Ch. *Cal.* Perianth inferior, of eight deep segments in two rows, ovate, acute, coriaceous, permanent. *Cor.* of one petal, wheel-shaped, its segments in two rows, numerous, oblong, entire or divided, the length of the calyx. *Stam.* Filaments eight, awl-shaped, hairy, very short; anthers oblong, erect, as long as the calyx. *Pist.* Germen superior, roundish, rough; style cylindrical, smooth, the length of the corolla; stigma simple, very blunt. *Peric.* Berry of one cell, oval, pointed. *Seeds* one or two, oval, hard.

Obs. Mr. Brown describes an equal number of abortive filaments, alternate with the stamens, and the calyx as in some instances six-cleft. The germen has originally six or eight cells. Dr. Roxburgh also found the abortive filaments.

Ess. Ch. Calyx of eight segments in two rows. Corolla of one petal, in numerous segments, in a double row. Berry with one or two seeds.

1. *M. Elengi*. Linn. Sp. Pl. 497. Fl. Zeyl. 57. Roxb. Coromandel. v. 1. t. 14. (Elengi; Rheed. Hort. Mal. v. 1. 33. t. 20.)—Leaves alternate, remote, ovate, pointed.—A native of sandy places in the East Indies, and much cultivated for its highly fragrant blossoms, which expand chiefly in the hot season. These flowers are sacred to the Hindoo gods. The root of this tree is thick and fixed deeply in the earth. *Trunk* branched, many feet in cir-

cumference, covered with a brown and frosty bark. *Leaves* alternate, on short stalks, somewhat drooping, veined, very firm, of a deep shining green, three or four inches long and about half as broad. *Flowers* stalked, two or three at the base of the leaf stalks, slightly drooping, white or yell with, very fragrant. *Seed* compressed, shining, chestnut-coloured. The wood of this plant is said by Rheed to be remarkably durable in water, but on the contrary very subject to become rotten if exposed to the air.

2. *M. parviflora*. Brown Prodr. Nov. Holl. v. 1. 531.—A native of the tropical part of New Holland.—Leaves oval, pointed, smooth on both sides. Flower-stalks erect to three, downward, longer than the downy leaf stalks.—All that we know of this species is from its discovery by Mr. Browne, who says that it is very nearly allied to *M. Elengi*, but that the flower-stalks of the latter are more numerous, and shorter than the leaf stalks, which are smoothish.

3. *M. Kauli*. Linn. Sp. Pl. 497. Fl. Zeyl. 57. Brown Prodr. Nov. Holl. v. 1. 531. Willd. n. 3. (*Metrilideros macassarensis*; Rumph. Ambon v. 3. t. 8.)—Leaves on shortish stalks, crowded together at the ends of the branches, ovate, obtuse, silvery beneath.—A native of the East Indies and Arabia, as well as of the tropical parts of New Holland.—The branches of this tree are thicker than those of *M. Elengi*, having small scars scattered all over them. *Leaves* crowded together at the ends of the branches. *Flowers* very similar in structure, but larger than those of the first species.—The berries are eaten in their crude state by the natives of Macassar, and are said to have a pleasant flavour. The foliage is extremely ornamental, and the wood useful for the handles of tools and such purposes.—Mr. Brown hazards a doubt whether the *Manil-kara*, Rheed. Hort. Mal. v. 4. t. 25, can possibly be cited as a synonym of *M. Kauli* on account of its six-cleft flowers, though they agree precisely as to foliage.

4. *M. hexandra*. Willd. n. 2. Roxb. Coromandel. v. 1. t. 15.—Leaves alternate, obovate, emarginate. Flowers hexandrous.—Native of the East Indies in the mountainous, uncultivated parts of the Circars. It flowers towards the beginning of the wet season.—The trunk of this large tree is erect, and much branched, with an ash-coloured bark. *Leaves* alternate, on stalks, wedge-shaped, deeply emarginate, very hard, of a deep shining green, three to five inches long, and about a third as broad. *Flowers* several together, axillary, stalked, variegated with white, lilac and yellow. *Berry* the size and shape of an olive.

5. *M. Imbricaria*. Willd. n. 5. (Imbricaria; Juss. et Lamarck' Illustr. t. 300.)—Leaves crowded together at the ends of the branches, ovate, obtuse, remote. *Berry* with many seeds.—A native of the Isle of Bourbon.—We are inclined to believe that this is very near *M. Kauli*, or perhaps a variety of that species, although we have adopted it on the authority of Willdenow.

MINA, $\mu\upsilon\alpha$. The Attic mina was either nummular or ponderal; in the first acceptation it was the sixtieth part of a talent, and contained a hundred drachmæ, or denarii, amounting in our coin (if we allow nine-pence for the value of the drachma), to three pounds fifteen shillings. The mina of Athens contained, at first, seventy-three drachmæ; but Solon gave it a hundred. Mina, considered as a weight, was also divided into a hundred drachmæ. It was regarded as a pound weight of the country to which it belonged; and the Attic pound is considered as the same with the Roman, and very nearly one pound troy. See **DRACHM**.

Mina was also a medicinal weight, consisting of twelve Roman ounces; but as in coinage eight drachms were allowed to the ounce, the mina, or pound, contained ninety-six, *i. e.*

the pound in weight consisted in fact of ninety-six drachmæ, while the pound in tale had a hundred. Dr. Arbuthnot asserts that the common Attic pound contained sixteen ounces, and was equal to our pound avoirdupoise; but this assertion seems to be contradicted by ancient testimony. See COIN and WEIGHT.

MINA, or *Mine*, in *Commerce*, a corn measure of Genoa, equal to 8 quarte, or 96 gombette: 100 English quarters = 233 mina, and a moundino of salt = 8 mine. See MEASURE.

MINA, in *Geography*, a town of Algiers; 50 miles S.E. of Oran.—Also, a river of Algiers, which runs into the Sheliff, 12 miles E. of Mustyganim.

MINA, or *Minau*, a sea-port town of Persia, in the province of Kerman, at the entrance of the gulf of Persia, at the mouth of the river Ibrahim, the air of which is insalubrious. It is surrounded with walls, and defended by towers, and has medicinal springs and baths; 42 miles W. of Ormus. N. lat. 27 8'. E. long. 56 40'.

MINADA, a town of Japan, in the island of Nippon; 20 miles N. of Xenday.

MINADAH, a river of Bengal, which runs into the Ganges at its mouth, N. lat. 22 45'. E. long. 91° 3'.

MINAES GERAES, a jurisdiction of South America, in Brazil, situated between the 15th and 22d degrees of S. lat., and the 25th and 33d degrees of W. long. The number of inhabitants is computed to be about 35,180 whites, 26,075 Indians, and 108,400 slaves. The fifth part of the gold found in this jurisdiction, and formerly paid to the king of Portugal, is estimated yearly to be about five millions of livres.

MINAGGNHINIM, a pulsatile instrument of music among the Hebrews, which was a square table of wood, fitted with a handle; over this table was stretched an iron chain, or hempen cord, passing through balls of wood or brass, which struck against the table when the instrument was shook, and occasioned a clear sound, which might be heard at a great distance.

MINARES, in *Geography*, a river of Spain, which waters the province of Aragon.

MINAS, *Basin of*, or *Les Mines bay*, sometimes called "Le Grand Praye," a gulf on the S.E. side of the bay of Fundy, into which its waters pass by a narrow strait; about 30 leagues from the entrance of Annapolis, and ten from the bottom of Bedford bay; 12 leagues in length and three in breadth.

MINAS, or *De las Minas hill*, the middlemost of the three hills, serving as inland marks for Bonaventura bay and river, on the coast of Peru, in South America; S. of Panama bay. N. lat. 3 20'. W. long. 75° 18'.

MINAS des Rixas, a town of Brazil, in the government of Goya; 85 miles N. of Villaboa.

MINASCOU BAY, a bay in the river St. Mary, between lake Superior and lake Huron; containing several islands. N. lat. 46. W. long. 84.

MINATO, Count NICOLA, of Bergamo, in *Biography*, a dramatic poet of great fertility. The reputation which he had acquired in writing for the theatres of Venice, occasioned his being engaged at Vienna as imperial poet laureate. He furnished the emperor's lyric theatre with a great number of serious operas, and still more small occasional dramas and poems for music. On every birth-day and occasion of joy and festivity, an analogous piece or two, besides the fixed operas for winter and autumn. These operas passed into Italy, where they were new set and performed with success. This poet possessed a perfect knowledge of history, his fable was generally well planned, and his cha-

raeters well sustained. He had genius and invention, and gave good opportunities for decoration and machinery. He flourished from about 1650 to 1683.

MINATTA, *Isle la*, in *Geography*, lies on the N. coast of lake Superior, in Upper Canada, near to, and E. of, the grand Portage, extending to Thunder bay.

MINAYA, a small town of Spain, in the province of La Mancha: it was formerly considerable, but is now almost reduced to the size of a village. The entrance to the parish church, which is of a moderate size, and has three chancels, is through a portico supported by two pillars of the Corinthian order, of white marble; 2½ leagues from La Roda.

MINAZZO, CAPE, a cape of Spain, on the W. coast of Galicia. N. lat. 42 51'. W. long. 91° 20'.

MINCA, a name given by the ancients to a very coarse and bad kind of myrrh.

MINCH, in *Geography*, a channel of the North sea, between the Hebrides and the main land of Scotland.

MINCHA, in the *Jewish Customs*, offerings of meal, cakes, or biscuits, made in the temple of the Lord. The Seventy have sometimes preserved this word in their translation; but instead of *mincha* they read *mana*, which doubtless was the received pronunciation in their time. We find *mana* in the same sense in Baruch, i. 10. Levit. ii. 3, &c. See the Greek of Jerem. xvii. 26. Dan. ii. 46. 2 Kings, viii. 5. 9. xvii. 7. xx. 12. 2 Chron. vii. 7. Nehem. xiii. 5, 9, &c. Calmet. Dict. Bibl.

MINCHIN-HAMPTON, in *Geography*, a market-town in the hundred of Longtree, and county of Gloucester, England, is situated on the declivity of a gentle eminence, and consists of four irregular streets, intersecting each other at right angles. The chief trade of this town is a manufacture of cloths, which is carried on to a considerable extent, the many brooks and rivulets in the vicinity being extremely favourable for the purpose. The church, which is built in the form of a cross, was founded by the nuns of Caen, in the reign of Henry III. Numerous monuments and sepulchral inscriptions diversify the interior of this fabric; and in the church-yard appears a brass plate, in honour of Mr. James Bradley, the celebrated astronomer, who was a native of Gloucestershire, and died in 1762. Here are three market-houses, two of which were erected by P. Sheppard, esq. in the year 1700, with the view of establishing a wool-market, but the design failed of success. Here is likewise a respectable free-school. Leland says "there were nunnes" in this town; and Camden and Speed hence affirm it contained a nunnery. Bishop Tanner, however, considered this statement as erroneous, and says, "this place was called Minchin-Hampton, only because the manor was given to the nuns, or minchins of the Holy Trinity, at Caen, in Normandy, by William the Conqueror." The abbess of that monastery purchased for it the privilege of a weekly market, which continues to be held on Tuesday. According to the parliamentary returns of 1801, this town contained a population of 3419 persons, of which number 1549 were males, and 1870 females. To the west of this town lies an extensive common, called Amberley, remarkable for being the site of a very singular encampment. The great vallum of this work is irregular, and has smaller trenches branching from it. It extends nearly three miles in length, to a spot called Woeful-Dane-Bottom, probably in memory of some signal defeat sustained here by that people, whom Mr. Fosbrooke conjectures to have occupied this camp as a summer residence, during their abode at Cirencester in the year 879. At Rodmarton, a small village near the fols-way, which passes through this district, a tessellated pavement and other Roman remains were discovered about the

the middle of the seventeenth century. Horley, a dilapidated market-town, two miles from Minchin Hampton, contains some fragments of a priory, formerly dependent on the monastery of St. Martin's, at Troues, in Normandy. In a field adjoining to Catcombe park, the seat of Philip Sheppard, esq., is a large oval tumulus, now planted with firs, which had erect stones at each end of it. On its summit is placed a huge fragment of rock, evidently a sepulchral monument, which has been long distinguished by the appellation of Tingle-stone. At some distance from this tumulus appear two large stones, set upright in the ground; one has its top broken off, but the other is perfect, and rises ten feet above the surface. Tradition assigns one or both of these memorials to Long, a Danish chieftain, whence comes the name Long's stone, or pillar. Bigland's History of Gloucestershire, vol. ii. folio. Beauties of England and Wales, vol. v.

MINCHIVAVIDA, a small island in the South Pacific ocean, near the coast of Chili. S. lat. 44° 40'.

MINCIO, a river of Italy, which rises in lake Garda, forms the lake which surrounds the city of Mantua, and afterwards runs into the Po near Sassetta.—Also, a department or division of the new kingdom of Italy, consisting of what was before the revolution the duchy of Mantua, containing 123,649 inhabitants, who elect nine deputies. The capital is Mantua.

MIND, **MENS**, denotes a thinking or understanding being. See **SMITH**.

Philosophers generally allow three kinds of minds, *viz.* *God*, *angels*, and the *human soul*. For a thinking being must either be finite or infinite: if infinite, it is *God*; and if finite, it is either joined with a human body, or not; if the latter, it is an *angel*; if the former, a *soul*.

The *human mind* is properly defined a thinking rational substance; by *thinking* it is distinguished from body; and by *reasoning* from God and angels, who are supposed to see and know things intuitively, without the help of deduction and discourse.

MIND. *Affection of the*. See **AFFECTION**.

MINDANAO, or **MAGINDANAO**, in *Geography*, one of the Philippine islands, and interior only to Luçon in extent: it is of a triangular form, and in circumference about 900 miles, but so intersected with promontories and bays, that a person might cross it in a day and a half. It was discovered by the Spaniards who accompanied Magellan. It lies S.E. of Manila, at the distance of 600 miles. Although mountainous, the vales consist of a rich black mould, watered with the finest rivulets; it furnishes ample supplies of rice, and also palm-trees, the pith of which affords sago, and this, when reduced to meal, is used for making bread and biscuit throughout all the island. It has a variety of fruits in common with the other islands of this archipelago; but the cinnamon is peculiar to itself, and the trees that furnish it grow on the mountains without culture, and without being regarded as the property of any individual. By digging deep in the ground, and searching the rivers, the inhabitants find good gold. They also collect plenty of sulphur from the burning mountains. The scenery of Mindanao is beautiful, and it is fertile in a variety of productions. The chief Spanish settlement is at Sambuang, in the S.W. The "Lano" is a large inland lake, about 60 miles in circumference: horses and buffaloes have multiplied here to a surprising degree. In the south, there is a volcano of constant eruption, which serves as a sea-mark. In the strait between this island and that of Xolo, very large pearls are found. N. lat. 5° 40' to 9° 55'. E. long. 122° to 126° 27'.

MINDAY, a town of Pegu; 8 miles S. of Prome.

MINDELHEIM, a town of Bavaria, and capital of a lordship, about 8 miles square; 22 miles S.W. of Augsburg. N. lat. 48° 2'. E. long. 10° 27'.

MINDEN, a principality of Germany, in the kingdom of Westphalia, about 96 miles in circumference, consisting of good corn land, so that agriculture is carried on with great diligence and with such success, that from hence neighbouring countries are supplied with flax and corn, and particularly with wheat and barley. This principality has also wood, turf, coal, and a productive salt-work, and plenty of fish. The Roman Catholics only enjoy in the town of Minden, and the Calvinists every quarter of a year, at the citadel of Petershagen, their public worship; all other churches in the country belong to the Lutherans. This principality is now annexed to the kingdom of Westphalia.

MINDEN, a city of Westphalia, and capital of the fore-mentioned principality, and formerly one of the Hanse towns, is situated on the Weser. It is about two miles in compass, and surrounded with walls and ramparts. Its situation for commerce is advantageous, and some of the inhabitants carry on a considerable brewery; others are employed in agriculture and breeding of cattle. The cathedral is a considerable building, and the chapter consists of 18 persons, partly Roman Catholic and partly Lutheran. This town was an important place, even in the reign of Charlemagne; and it has since been contended for, and occasionally possessed by the Imperialists, Swedes, and French; 30 miles E. of Osnabruck. N. lat. 52° 18'. E. long. 8° 56'.

MINDEN, a post-town of America, in Montgomery county, New York; 472 miles from Washington.

MINDEPILLY, a town of Hindoostan, in Myfore; 8 miles W. of Veniatighery.

MINDERER, **RAYMOND**, in *Biography*, a physician of Augsburg, who was distinguished in the early part of the seventeenth century as a partizan of the chemical sect. He was also eminent as a military physician, in which capacity he served several campaigns, with universal esteem throughout all ranks in the army; whence he also rose to high reputation and practice in the courts of Vienna and Munich, and was consulted by the principal nobility. He published the result of his experience relative to the diseases of armies, in the German language; and this work was translated into Latin, with the title of "Medicina Militaris, seu, Liber Caltrensis, epositorista et facile parabilia Medicamenta continens," Vienna, 1620, 8vo. This work was several times reprinted, and was also translated into English in 1674. He was likewise author of the following works. "De Pestilentia Liber unus," *ibid.* 1608. "Alœdarium Marocoftinum," *ibid.* 1616, and afterwards republished. "De Calcantho, seu Vitriolo, ejusque qualitate, virtute, et viribus," 1617. "Threnodia Medica, seu, Planctus Medicinæ lugentis," 1619. His chemical reputation is evinced by the connection of his name in the shops, even at this day, with the neutral salt, the acetate of ammonia, which is called Mindererus' spirit. Eloy. Dict. Hist.

MINDERERI SPIRITUS. See **VINEGAR**.

MINDIGAUT, in *Geography*, a town of Hindoostan, in Dooab; 5 miles S.E. of Canoge.

MINDIUM, in *Botany*, Juss. 164. Medium Dioscoridis, Mindium Rhazis; Raaw. It. 284. See **MEDIUM** and **MICHAUXIA**.

MINDO, in *Geography*, a town of South America, in the audience of Quito; 20 miles N.W. of Quito.

MINDORO, one of the Philippine islands, about 27 miles S. from the island of Luçon, triangular in figure, and about 150 miles in circumference. It is high and

mountainous, abounding in cocoa and other fruit-trees, with some rice. A part of the sea adjoining this island is called the "sea of Mindoro." N. lat. $12^{\circ} 21'$ to $13^{\circ} 30'$. E. long. $120^{\circ} 24'$ to $121^{\circ} 24'$.

MINDOWLY, a town of Hindoostan, in the circar of Singrowl; 10 miles N. of Seipour.

MINDYGUR, a town of Hindoostan, in Oude; 5 miles S. Canage.

MINE, a town of Abyssinia; 170 miles S.W. of Gondar. N. lat. $0^{\circ} 4'$. E. long. $35^{\circ} 30'$.

MINE. This word is applied generally to all works carried on under ground, but seems principally to belong to such as have for their object the discovery and production of the metallic ores.

The construction of the works in various mines differs according to circumstances, such as the form of the hills in which they are situated, or the position of the ores, whether found in veins or beds. Some mines are formed by a level or drift entering the foot of a mountain, and extending to the deposits of metal within it, which may be taken away and carried out through this opening; and in this case *shafts* are only required for the purposes of ventilation.

This seems to be the simplest state of mining, and is, as well as such mines as have been formed by following ore from the surface to such depths as water would permit, to be ranked among the earlier efforts of this kind.

The more extended operations of mining are to be found where regular metallic veins, situated in primitive rocks, are worked to great depths below the level of the sea, where perpendicular *shafts*, drained of the constantly accumulating water by engines, form the means of communication from the surface to *levels* driven upon the *lode* or vein, at various and successive depths, so as to open all parts of it for the discovery of its contents.

A mine thus constructed, of any considerable extent, is one of the most extraordinary instances of human enterprize, patience, and ingenuity; especially if it be considered that its formation depends upon the application of two of the most wonderful discoveries on record, the expansive forces of gunpowder and steam.

Mines in Cornwall and Devon are generally worked by a company of proprietors, called adventurers, who agree with the owner of the land, or lord of the soil, as he is usually denominated, to work the mine for a certain term of years, paying him, by way of rent, a proportion of the ores raised, or an equivalent in money. The grant thus made to the adventurers is called a *feet*, and the lord's rent, if paid in ore, is called the *disb* (probably from the ancient practice of measuring it by a vessel of that sort), and when settled for in money, has the term *dues* applied to it.

The adventurers divide their undertaking into shares of different magnitude, but usually forming in the whole some even and easily divisible number. The smallest share usually held by one adventurer is one sixty-fourth part, though in some large mines this share is divided, and a person may then have only a one hundred and twenty-eighth part of the whole, while others may hold eighths, others sixteenths or thirty-seconds, and some larger proportions, but the whole added together make up sixty-four shares. Any part of the concern held by one person is generally called a *dole*, and distinguished as to its relation to the whole by adjoining to this word the denomination of its value, as an eighth dole, a sixteenth dole, &c.

Mines in Cornwall and Devon are usually named as soon as they are undertaken, and this practice seems to have been of considerable antiquity, as the word *wheal*, or *huel*, usually even now prefixed to these appellations, is derived from the an-

cient Cornish language, and signifies a work or mine. The other parts of the names of mines often relate to the situation, or have been given in compliment to some person connected with them, or adopted according to the fancy of the adventurers. Thus Wheal Rose is probably derived from the Cornish word *ros*, a valley, and means therefore the mine in the valley; Wheal Godolphin has the name of a family; and among the arbitrary appellations which are the most numerous, may be instanced Wheal Unity, Wheal Virgin, Wheal Jewel, &c.

The *bounds*, or limits of the set of a mine, are usually marked out upon the surface, and include the space of ground in which any company of adventurers have contracted for the right working. Bounds for working tin are recognized by the statutory laws of Devon and Cornwall, as a property in themselves distinct from the possession of the soil, and were probably originally granted to encourage the search for this metal by the laws of the duchy, that the revenue of the chief lord might not suffer by the unwillingness of the possessor of the soil to have its surface disturbed. Tin bounds that have been legally renewed, or possession retained, are even now in their original state in this respect; but copper mines, and also many tin mines, are now generally held of the possessor of the fee.

Mines are generally conducted in Cornwall and Devon by a manager appointed by the adventurers, who held meetings at the counting-house to revise and pass the accounts, and to debate and determine on all subjects relative to the prosecution of the works submitted to them.

Under the principal agent others are appointed, who are practical miners, and who superintend the various operations and settle the terms of the contracts with the workmen, which are made by a kind of public auction. These agents are called *captains*, and the number employed in a mine is in proportion to its extent and importance. Some attend principally to the works below, and are therefore called *under-ground captains*; others take charge of the operations on the surface, and are therefore distinguished by the appellation of *grafs captains*. It would be injustice to this useful and respectable body of men to pass them over without noticing the intelligence, activity, and skill by which the agents of the mines in the districts alluded to are distinguished.

The establishment of a mine further includes occasionally an engineer, a head carpenter and smith, who have each their workmen under their care; a *pitman*, who directs the fixing and repair of the pump-work; a *timberman* or *binder*, who superintends the construction of the woodwork under ground, for securing the shafts, ladders, levels, and so on; and besides these operative men, there are usually clerks to keep the accounts, and persons to receive and deliver to the workmen the materials used in their operations.

The miners working under ground are divided into two classes, according to the mode by which they are paid. Those of the first class are called *tributers*, who work on the productive parts of the mine, and receive a proportion of the ore which they procure and make merchantable, for their labour. This mode of payment, by its occasionally leading to unusual profit, stimulates to great exertion in the discovery of fresh deposits of ore, and is therefore conducive to the interests of the employer as well as the workman. To the reward thus held out to skill and intelligence, may probably be attributed the prevalence of these qualities, which may be observed more particularly in this class of Cornish miners. The other workmen employed under ground are denominated *tutwork-men*, who agree for sinking shafts, driving levels, and so on, at a certain price *per fathom*. These prices are exceedingly various, as the rock to be penetrated differs in degrees

gress of hardships, or the nature of the work exposes the men to more or less danger or inconvenience from water or bad air.

The people employed on the surface in dressing the ore, generally perform their labour by talk-work, the amount being charged to the account of the tributers, whose ore is undergoing this process.

The copper ores, when ready for sale, are sampled by agents of the smelting companies, who visit the mines for that purpose, and are sold on a fixed day by a public sale, called a *ticketing*, and afterwards weighed and carried to a port and shipped to Wales, where the copper smelting houses in general are. Tin ores are smelted in Cornwall, and are sold by the miner to the owners of the smelting houses by private contract, valuing them by an assay made by the buyer. In this respect the value of tin ores is determined by a mode much more uncertain and irregular than that employed for copper, the assay of which is conducted with extreme care, and wonderful accuracy.

The extent of the returns and costs of the mines in Cornwall and Devon, both collectively and separately, may be seen by referring to the history of mining in this district, where the tables of the state of these concerns exhibit a very interesting picture of the great increase of these extensive undertakings. See *Mining, History of*.

The king by his prerogative hath all mines of gold and silver to make money; and therefore those mines, which are properly royal, and to which the king is entitled when found, are only those of silver and gold. (2 Inst. 577.) By the old common law, if gold or silver be found in mines of base metal, according to the opinion of some, the whole was a royal mine, and belonged to the king; though others say that this was only the case, when the quantity of gold or silver was of greater value than the quantity of base metal. (Plowd. 336.) But by statute no mines of copper, tin, iron, or lead, shall be adjudged royal mines, though gold or silver be extracted. (1 W. and M. c. 30.) And persons having mines of copper, tin, lead, &c. shall enjoy the same, although claimed to be royal mines; but the king, or persons claiming royal mines under his authority, may have the ore (except tin-ore in Devon and Cornwall) paying to the owners of the mines, within thirty days after it shall be raised, and before removed, 16*l.* per ton for copper-ore washed, and made merchantable; for lead-ore 9*l.* per ton; tin or iron, 40*s.* &c. (Stat. 5 W. & M. c. 6.) If any person maliciously set on fire any mine, or pit of coal, he shall be guilty of felony, without benefit of clergy, by stat. 10 Geo. II. c. 32. If any person shall wilfully or maliciously set fire to, burn, demolish, pull down, or otherwise destroy or damage any fire-engine, or other engine erected for draining water from coal mines, or for drawing coals out of the same; or for draining water from any mine of lead, tin, copper, or other mineral, or any bridge, waggon-way, or trunk erected for conveying coals from any coal mine, or staith for depositing the same; or any bridge, or waggon-way erected for conveying lead, tin, copper, or any other mineral, from such mine, or cause the same to be done, he shall be guilty of felony, and transported for seven years. (9 Geo. III. c. 29.) Provided that no person be prosecuted under this act beyond 18 months after the offence committed. By 39 & 40 Geo. III. c. 77, destroying or damaging mines or roads leading to or from the same, &c. incurs the guilt of misdemeanor, and any one person so offending may, on conviction, be imprisoned for any time not exceeding six months. Colliers and miners working in a manner contrary to their agreement, or not fulfilling their contracts, shall, on conviction, forfeit not exceeding 40*s.* and on non-payment be imprisoned for a time

not exceeding six months, or until the penalty and costs shall be paid. Stealing ore out of mines is no larceny, except only those of black-lead, the stealing ore out of which is felony, punishable with imprisonment and whipping, or transportation not exceeding seven years, and escaping from such imprisonment, or returning from transportation is felony, without benefit of clergy, by 25 Geo. II. c. 10.

Mine-venturers Company of, had its first rise about the year 1600, when certain mines of lead and copper were found in South Wales, which were divided by the proprietors into twenty-four shares; and in 1603 sub-divided into four thousand and eight shares, for the term of twenty-two years and a half; to which term five years more were added in 1608, and the affairs of the company regulated by a new constitution. In 1704, queen Anne granted a charter of incorporation to this company; in consequence of which several new shares were added, so that the whole number amounted to six thousand and twelve. However, the interests of this corporation were so ill managed, that the proprietors and creditors petitioned parliament in 1710, and a committee of the house of commons was appointed to enquire into its state. The result of the enquiry was a censure on the principal managers; and though, in 1711, a law was passed for the better regulation of the company, and the relief of the creditors and proprietors, nothing could preserve it from sinking.

MINE, in the *Art of War*, denotes a subterranean canal or passage dug under the wall or rampart of a fortification intended to be blown up by gunpowder.

The passage of a mine leading to the powder is called the *gallery*. These passages or galleries made within the fortification, before the place is attacked, and from which several branches are carried to different places, are generally four feet wide, and five feet high, and the earth is supported from falling in by arches and walls, as they are to serve for a considerable time; but when mines are to be used in a short time, the galleries are only about three feet wide and five high, and the earth is supported with wooden frames or props. When the gallery is carried on to the place where the powder is to be lodged, called the *chamber*, the miners make this generally of a cubical form, large enough to hold the wooden box, which contains the powder necessary for the charge; this box is lined with straw and sand-bags, to prevent the powder from contracting any dampness. The chamber is sunk somewhat lower than the gallery, unless the besieged can raise the water in the ditch, and incommode the gallery; in which case the chamber is made higher than the gallery, that the water may not be let in and spoil the mine. The line, drawn from the centre of the space containing the powder, perpendicular to the nearest surface, is called the line of *least resistance*; the pit or hole, made by a mine when sprung, is called the *excavation*. The fire is conveyed to the mines by a pipe or hose, made of coarse cloth, whose diameter is about an inch and a half, called *saucisson*, extending from the chamber to the entrance of the gallery, to the end of which is fixed a match, that the miner who sets fire to it may have time to retire before it reaches the chamber. In order to prevent the powder from becoming damp, the saucisson is laid in a small trough, called *auge*, with straw in it, and round the saucisson, with a wooden cover nailed upon it. There are various kinds of mines, which acquire different names; as *royal mines*, *serpentine mines*, *forked mines*, as their passages are straight, oblique, winding, &c. The mines made by the besiegers in the attack of a place are simply called *mines*, and those made by the besieged *counter-mines*. They are both made in the same manner, and for the like purposes, *viz.* to blow up their enemies and their works; only the principal galleries and mines of the besieged are usually made

before

before the town is besieged. The besieged generally make a great many small mines under the glacis, of about six, seven, or eight feet deep under ground, which are called *fougasses* or *fougades*. They make likewise another fort, called *coffers* or *caissons*, which are a kind of wooden boxes three or four feet long, and a foot or eighteen inches wide, which they bury four, five, or six feet under the glacis, and about four yards distant from each other.

MINES, History of. It is observed by writers on this subject, that mines were in use long before the invention of gunpowder; for the ancients made galleries or subterraneous passages under the walls of places, and supported them with strong props; filling the interval with all kinds of combustibles, which being set on fire burnt their props, and, the walls being no longer supported, fell, whereby a breach was made. The besieged also made use of similar passages from the town under the besiegers' machines, with which they battered the walls, in order to destroy them. But the art of mining has received great improvements since the invention of gunpowder. The first mines which we read of, since the discovery of gunpowder, were used, in 1487, by the Genoese, in the attack of Serezanella, a town belonging to Florence: however, as these failed, they were neglected for a considerable time. The first successful application of the blowing of mines in sieges was in the kingdom of Naples, in the year 1503; when Pietro de Navarre by this means possessed himself of a fort garrisoned by the French. But the first celebrated use of these mines in opposing the progress of the besiegers was in the years 1666, 1667, 1668, at the siege of Candia; though they had been often practised in the defence of places before, in a less memorable manner; for by the assistance of this invention principally, the city of Candia kept the whole power of the Ottoman empire at bay for three years successively. Since that time the advantage of counter-mines hath been better understood. The last eminent instance of their great utility was in the defence of Turin, in 1706: for so effectually were the besiegers traversed thereby, that, after near four months of open trenches, they were not in possession of more than the counter-scarp, and even then, eleven pieces of their cannon were blown up by the defendants but three or four days before the place was relieved.

The first professed writer on mines was the celebrated M. Vauban; he was succeeded by M. de Valliere, one of the greatest masters in the art of mining; who, uniting theory with experiment, discovered, by measuring several excavations, that the pit or hole made in the earth, when the mine was sprung, was not an inverted cone (*Plate VI. Fortification, fig. 10.*) nor a frustum of a cone (*fig. 11.*) as Vauban and others had supposed, but nearly a paraboloid (*fig. 12.*); and his tables were computed according to that figure. It has been generally admitted by miners, that the diameter of the pit or hole made by the mine was always twice the line of the least resistance, and that this diameter should never exceed this proportion. But M. Belidor undertook to remove this prejudice; and however generally it may still prevail, he seems to have proved by many experiments, which have since been repeated by others, that the diameter of the hole made by a mine may be increased to any length in regard to the depth of the mine.

MINES, Theory of. The estimation of the proper quantity of powder with which a mine is to be loaded in any kind of soil, or at any depth under ground, in order to produce any proposed effect, is the most difficult part of the whole art of mining. This depends not only on the quantity of earth to be blown up, but likewise on the tenacity of the different soils in which the mines are made. The quantity of earth

to be raised depends on the figure of the excavation; for if this is known, the solid content may be determined by geometry; and by weighing exactly a cubic foot of that soil, we can easily discover what weight is to be raised; and by knowing what quantity of powder is required to raise a certain weight, the tenacity of the parts may also be had, by making a mine so as to produce a good effect; and subtracting the quantity of powder, necessary to raise the weight of the solid from the charge of the mine, the remainder would be the quantity necessary to overcome the tenacity. It is, however, disputed, as we have already observed, what the figure of the excavation is: it was at first imagined to be an inverted cone, as *A C B* (*fig. 10.*) whose vertex is in the centre of the chamber, and the radius of its base *A D* equal to its axis *C D*; but this being found to allow too small a charge, it was next supposed to be a frustum of a cone, as *A E F B* (*fig. 11.*) whose lesser base *E F* is equal to the line *C D* of least resistance, and the greater *A B* equal to twice that line. On this last supposition, said to be confirmed by the experiments of M. Maigrigny, under M. Vauban, near Tournay, miners have computed their tables of the quantities of powder necessary for charging mines at different depths.

However, Mr. Belidor disputed the conclusions of Maigrigny; whose experiments were examined by direction of the chief commander of the artillery of La Fere, in the construction of more than a hundred and fifty mines between the years 1725 and 1730. In the course of this enquiry, seven mines were made, whose line of least resistance was ten feet, and loaded with the following quantities of powder, *viz.* the first with 120lb.; the second with 160lb.; the third with 200lb.; the fourth with 240lb.; the fifth with 280lb.; the sixth with 320lb.; and the seventh with 360lb. These mines being sprung one after another, and their excavations examined, the diameters of their bases were found to be as follow: that of the first 22 feet; the second, 26 feet; the third, 29 feet; the fourth, 31½ feet; the fifth, 33½ feet; the sixth, 36 feet; and the seventh, 38 feet. These experiments invalidated the principles of Maigrigny; nevertheless miners have still doubted, whether the diameter of the excavation can be made greater than double the line of least resistance, or whether the excavation itself will not become like a well or pit when overcharged. As to the true figure of the excavation, this was discovered by M. de Valliere, and ascertained by others after him to be very nearly a paraboloid, as *A E B* (*fig. 12.*) having the centre of the powder or charge in the focus *C*, *C D* the line of least resistance, *A B* the diameter, and *C A* the radius. Mr. Muller, however, observes, that though the figure of the excavation is a paraboloid, the quantity of the earth to be blown up should be estimated by the part *A L M B*, cut off by a plane *L M*, passing through the focus or centre *C* of the chamber, parallel to the horizon *A B*; the other part *L E M* being occasioned by the force of the powder pressing downwards; because, he says, the explosion of gunpowder, acting on all sides alike, must condense the solid under the chamber from *L* to *M*, by its pressure downwards, so long as it presses the earth above *L M* upwards; and it cannot be said, that any particle of earth under the horizontal line *L M* can be drove upwards. In order to find the content of this solid, let *E K = E C = ¼* of *P*, or the parameter; and it appears from the well known properties of the parabola, that $A D^2 = E D \times P$; $L M = P$; and $C A = K D$. And in the right-angled triangle *C D A*, $C D^2 + D A^2 = C A^2 = K D^2$; and, therefore, $\sqrt{C D^2 + D A^2} = K D$; whence, if *C D* and *D A* are given, the line *K D*,
and

and consequently CK, or its equal CL, will be known; and, therefore, if the line of least resistance CD, and the radius DA of the base are given, the parameter may be found. Moreover, the solid content of the paraboloid is equal to half the cylinder of the same base and altitude; if r expresses half the circumference, whose radius is unity; *i. e.* if $r = 3.57$; then, because $1 : 2r$, or the radius to the circumference as the squares of the radii CL, DA, are to the areas of their circles; we have $r ED \propto AD^2$ for the solid LEM; therefore, their difference $r ED \times AD^2 - r EC \times CL^2$, will express the solid required. But if P expresses the parameter LM, then will $P \times ED = AD^2$, and $P \times CE = CL^2$, and these value, substituted in the expression of the solid, give $rP \times ED^2 - rP \times EC$: or, because $ED = EC + CD$, and $KD = CD + 2EC$, we shall have this expression reduced to $rP \times CD \times KD$. But as r is a constant number, it may be neglected in comparing the solids; and then $P \times CD \times KD$ will be the expression of the solid. And when two excavations are compared together, which have the same line of least resistance CD, the solid will be expressed by the rectangle $P \times KD$. Hence if this solid, or the quantity of earth to be raised, and the line CD of the least resistance be given, the parameter P may be found; and having the parameter and the line CD, the equation $P \times ED = AD^2$, will give the radius AD of the base. For if $CD = c$, and the given solid ALMB = a , then because $CE = \frac{1}{2}P$, the expression $P \times CD \times KD$ will give

$$Pc \times \frac{1}{2}P + c - a, \text{ or } PPc + 2Pcc = 2a, \text{ and } PP + 2Pc = \frac{2a}{c},$$

$$\text{to which adding } cc, \text{ we shall have } PP + 2cP + cc = \frac{2a}{c} + cc; \text{ and } P + c = \sqrt{\frac{2a}{c} + cc}.$$

In comparing mines together, which have the same line of least resistance, the rectangle $P \times KD$ gives $PP + 2cP = 2A$, to which adding cc , we shall have $PP + 2cP + cc = 2a + cc$, whose square root is $P + c = \sqrt{2a + cc}$. By means of these equations, all the different problems relating to mines are easily solved, on the supposition, that the forces of powder are proportional to their quantities, and, therefore, the charges also proportional to the quantities of earth to be raised in the same sort of soil, *i. e.* in soil of the same density and tenacity. Some writers, however, assert, that the elastic force of powder is greater in proportion in larger quantities than in small ones, which Mr. Muller denies; and Mr. Belidor gives another reason for diminishing the charges of mines, as the earth to be raised increases; which is, that not only the weight of the earth to be raised is to be considered, but likewise the pressure of the atmosphere over the surface of the excavation, which pressure is as the bases of the excavation, and these as the squares of the diameters; whereas the weights of similar solids are as the cubes of these diameters; and, therefore, this pressure being less, in proportion, in larger bodies than in smaller, the charges ought rather to be lessened in large mines than in the small. But this reasoning seems to be contradicted by experiments.

In order to know the quantity of powder necessary for blowing up a mine in a particular soil, several mines are to be made in it, having their lines of least resistance equal, but loaded with different quantities of powder, till one is found to have the desired effect. When this is found, the diameter of its base must be measured with the greatest accuracy, and

likewise the line of least resistance; and when these lines are determined, the parameter P of the parabola is found by the equation $KD = \sqrt{AD^2 + CD^2}$; and, having the parameter given, the quantity of earth or solid is found by the solid $P \times CD \times KD$, or by the rectangle $P \times KD$, as the lines of least resistance are different or the same. Thus solid, and the charge of the mine, will serve to find the effect of any other mine made in the same soil when the charge is given; or to determine the charge, so that the diameter of the base shall be of any given length, by means of the equation $P \times ED = AD^2$. The same being performed in all the different soils, which generally occur in making mines, will serve to make mines of any depth, or placed in any soil.

The miners divide the different soils into five species.

- | | | |
|--|------|---|
| 1. }
2. }
3. }
4. }
5. }
6. } | into | { loose earth or sand.
{ common middling light soil.
{ loam or strong soil.
{ potters' clay, or stiff soil.
{ clay mixed with stones.
{ all kind of masonry. |
|--|------|---|

It has been found, that a cubic foot of the first weighs 95lb; of the second, 124lb.; of the third, 126lb.; of the fourth, 137lb.; and 160lb. of the fifth. But as to masonry, it cannot be determined to any degree of exactness, as depending on the different kinds of stones or bricks of which they are made.

It is pretended, that there are nine pounds of powder required to raise a cubic toise of the first kind; 11 of the second; 13 of the third; 15 of the fourth; 18 of the fifth; and 20 or 25 to raise a cubic toise of masonry above ground; and 35 or 40 for raising the same quantity under ground.

These are the French weights and measures, which being reduced into English, give 8lb. of powder for the first kind of soil; 9.8 for the second; 11.6 for the third; 13.4 for the fourth; 16 for the fifth; 18 or 22.3 for the masonry above ground; and 31 or 35 for raising the same quantity under ground.

In the second volume of M. Vauban's Attack and Defence of Places, he says, that the following rules never fail.

A cubic toise of common earth requires 14 pounds of powder to be raised.

Stiff sand or loam, which may be dug without being supported, requires 17 pounds *per* toise.

Mixed earth requires 18 pounds *per* toise.

Potters' clay or stiff soil, 19 pounds *per* toise.

Fat or stiff earth mixed with pebble stone, 22lb.

Wet sand, which cannot be dug without being supported, 15lb.

These rules of M. Vauban make, therefore, the charges greater than those of later miners.

But this is a matter which must be decided by experiments; and when these are made with sufficient exactness, it will be easy to find the proper charge of a mine, so as the diameter of its base be of any given length; or when that length is given, to determine the charge required. *E. gr.* Let it be required to find the diameter of a mine made in the second sort of soil; which being loaded with 100lb. of powder, say, if 11 pounds raise a cubic toise, or 216 cubic feet of earth, how much will raise 100lb.; the fourth term, which is 1964, will be = a ; and $2a = 3928$; and supposing the line of least resistance CD to be 10 feet, then

$$\text{will } c = 10; \text{ hence the equation } c + P = \sqrt{\frac{2a}{a} + cc},$$

will give $c + P = \sqrt{402.8} = 20$; or $P = 10$, and $EC = \frac{1}{2}P = 2.5$; $ED = 12.5$; whence the equation $P \times ED = AD^2$, gives $10 \times 12.5 = 12.5 = AD$, or $AD = 11.2$ nearly.

But to shew how far this theory agrees with the experiments mentioned before, we may suppose the first to be true, and from thence proceed to find what the diameters of the bases of the others will be. All the lines of least resistances of these mines were ten feet each, the diameter of the base of the first mine was found to be $22\frac{2}{3}$ feet; so that AD is $= 11.33$, or 11.4 $CD = 10$; these values being substituted in the equation $KD = \sqrt{CD^2 + AD^2}$, will give $KD = \sqrt{229.96} = 15.16$; and $2KC = P = 10.32$; hence these values being substituted in the rectangle $P \times KD$, because the line of least resistance is here always the same, gives $10.32 \times 15.16 = 156.5$, for the solid, which must be remembered, because it is the standard number whereby the other solids are determined.

Now if 120lb. gives 156.5, how much gives the charge 160lb. of the second for its solid, the fourth term gives $208\frac{2}{3} = a$, and $2a = 417\frac{1}{3}$; this value, as well as that of $c = 10$, being substituted in $P + c = \sqrt{2a + cc}$, gives $P + c = \sqrt{517.4} = 22.7$; hence $P = 12.7$, $EC = \frac{1}{2}P = 3.2$, and $ED = 13.2$. Now these values being substituted in $P \times ED = AD^2$, give $AD^2 = 167.64$, and $AD = 13$ nearly; and as AB has been found by measurement to be about 26, it shews that this computation answers very nearly the experiment.

If as the charge 120 of the first is to the charge 200 of the third, so is the solid 156.5 of the first to the solid of the third; we shall have $a = 260.84$, or $2a = 521.68$; and as $c = 10$, the equation $P + c = \sqrt{2a + cc}$ gives $P + c = \sqrt{621.68} = 24.93$ nearly; hence $P = 14.93$, $\frac{1}{2}P = EC = 3.73$, and $ED = 13.73$; these values being substituted in $P \times ED = AD^2$, give $AD = 14.32$, and $AB = 28.64$; which answers nearly the experiment; it was found that $AB = 29$ nearly.

If we proceed thus with regard to the 4th, 5th, 6th, and 7th experiments, we shall find the diameters of the base to be as follows; that of the 4th, 31.2; that of the 5th, 33.2; the 6th, 35.3; and that of the 7th, 37.4; which answers pretty near the experiments.

In this method of constructing mines, any opening may be made, whatever be the line of resistance; and by making this line small, and loading the mine with more powder, the inconvenience of a large excavation, which affords lodgment to the besiegers, is avoided: besides, the shafts and galleries are sooner made, and several mines may be placed under one another, by which the same spot of ground may be blown up several times.

If it were required to make a mine in the same sort of soil as that in which the seven experiments mentioned before were made, so that the line of the least resistance shall be equal to the radius of the base, and each of ten feet, and to find the quantity of powder necessary for its charge. Because $AD = CD = 10$, the equation $KD = \sqrt{AD^2 + CD^2}$, will give $KD = \sqrt{200} = 14.14$; hence $P = 8.28$; these values being substituted in $P \times KD$, will give 117, nearly, for the solid; then if we say, as the solid 156.5, of the first experiment, is to the solid 117, so is the charge 120 to the charge required, it will be 90lb. nearly. But if it was required to find the quantity of powder necessary to raise a cubic fathom, or 216 cubic feet of this soil; then because $CD = 10$ has been neglected in the solid 156.5, of the

first experiment, as likewise the ratio r , therefore the quantity must be multiplied by $r = 10$; or because $r = 1.57$ by 15.7, which will give 2457; then if we say, as 2457 requires 120lb. of powder, how much will 216 require; and the fourth term, which is 10.5lb, will be the number sought. From whence it appears, that the soil, in which these experiments were made, was a light sort of soil, somewhat lighter than that which is taken by the miners for the second sort.

M. De Valliere supposes, in his table, inserted below, that a mine, whose line of least resistance and radius of the base are each ten feet, requires 93 $\frac{1}{2}$ lb for its charge. Now, if it be required to find what kind of soil these mines are made in, by substituting the number for CD , AD , in the equation $KD = \sqrt{AD^2 + CD^2}$, we shall have $KD = \sqrt{200} = 14.4$, and $P = 8.28$; now these values being substituted in $rP \times CD \times KD$, we shall have $15.7 \times 8.28 \times 14.14 = 1838$; then if we say, as 1838 is to 93 $\frac{1}{2}$, so is 216 to 11. This fourth term will express the number of pounds of powder required to raise a cubic fathom of the same sort of soil, which therefore is the second sort.

The preceding computations have been made of French weights and measures, to shew how nearly the foregoing theory agrees with the experiments made at La Fere. It remains now to apply it to our own weights and measures; because eight pounds of powder will raise a cubic fathom of earth of the first sort; if we say a cubic fathom, or 216 cubic feet, is to eight pounds, as 1838 cubic feet is to 68.074 pounds, this fourth term will be the charge of a mine, whose line of resistance is 10 feet as well as the radius of the base: in the same manner are found the charges of the same mine in the rest of the soils. But the shortest way of computing tables is to subtract the logarithm of 216 from that of 1838, which gives 9298917; now if to this logarithm we add those of 8, 9, 8, 11.6, 13.4, 16; the weight of the powder required to raise a cubic fathom of the different soils, found before; we shall have 1° 83298, 2° 92112, 3° 99435, 4° 05699, 5° 14301 for the logarithms of the charges of a mine whose line of least resistance is 10 feet, and the diameter of the base 20.

Valliere's TABLE for the Charges of Mines.

Length of the line of least resistance.		Charge of Powder.		Length of the line of least resistance.		Charge of Powder.	
Feet.	lb. oz.	Feet.	lb. oz.	Feet.	lb. oz.	Feet.	lb. oz.
1	0 2	11	124 12	21	868 3	31	2792 4
2	0 12	12	162 0	22	998 4	32	3072 0
3	2 8	13	205 15	23	1140 10	33	3369 1
4	6 0	14	257 4	24	1296 0	34	3680 12
5	11 11	15	316 4	25	1559 9	35	4019 8
6	20 4	16	384 0	26	1647 12	36	4374 0
7	32 2	17	460 9	27	1815 4	37	4748 11
8	48 0	18	516 12	28	2058 0	38	5144 4
9	68 5	19	643 0	29	2256 7	39	5561 2
10	93 12	20	750 0	30	2530 4	40	6000 0

By this construction the radii of the bases being always equal to the lines of least resistance, the solids are similar, and therefore are to one another as the cubes of their axes; that is, as the cubes of the lines of least resistance. So that taking any one of the charges to be true, the others will be found by saying, as the cube of the axis whose charge is given is to its charge, so is the cube of the axis of any other mine to its charge.

For example, let the charge $93\frac{1}{2}$ of the mine, whose line of least resistance is 10 feet, be given; and it be required to find the charge of any other mine whose line of least resistance is given, suppose 15: then say, as the cube 1000 of 10 is to the cube 3375 of 15, so is the charge $93\frac{1}{2}$ to the charge required, which is 316.4, or 316 pounds 6 ounces, which is 2 ounces more than in the table. In the same manner is found the charge of a mine whose line of least resistance is 20; or because 20 is double of 10, the cube of 20 will be octuple the cube of 10; and therefore $8 \times 93\frac{1}{2}$, or 750 pounds, will be the charge of that mine.

A TABLE of the Charges of Mines according to Muller's Theory.

Diam.	Charge.	Diam.	Charge.	Diam.	Charge.
Feet.	Pounds.	Feet.	Pounds.	Feet.	Pounds.
22	150	42	639	62	1518
24	181	44	711	64	1621
26	217	46	773	66	1741
28	255	48	857	68	1842
30	297	50	946	70	1980
32	344	52	1020	72	2098
34	394	54	1115	74	2243
36	452	56	1205	76	2372
38	502	58	1299	78	2501
40	560	60	1406	80	2648

In this table the line of least resistance is supposed to be always 10 feet, and the charges producing the openings at the sides of them from 22 feet to 80. It is supposed that the charge $93\frac{1}{2}$ of a mine, whose line of least resistance and radius of the base are each 10 feet, is given, and from thence all the rest are computed by means of these equations, $KD = \sqrt{AD^2 + CD^2}$, and $P \times KD = a$; and by comparing the diameters of the bases found, by means of these equations, to be rather less than those found by experiments, it is presumed that the diameters marked in this table will not be found less, but rather greater in practice.

In order to find the size of the boxes, generally made cubical, in which the powder is lodged: as a cubic foot of common powder weighs about 55 pounds, if we say as 55 is to any other quantity to its cube; i. e. if the given quantity of powder be divided by 55, the quotient will be the cube required, and its cube root will be the length of the side of the box. The box must always be made a fourth bigger than it should be, on account of the straw and sand-bags put in it, for keeping the powder free

from wet; so that if the quantity of powder be 360 pounds, the fourth part of it, or 90, must be added, and the sum 450 divided by 55, whose quotient is 8.1818, and the square root of this, or 2.86 feet, or 34 inches, will be the size required. If the chamber happens to be placed on a rock, or any other hard substance, the force or action of the powder downwards, meeting with great resistance, will be employed in raising the earth upwards; and consequently the effect of the mine will be much greater than that produced by the same quantity of powder, placed on a softer substance. On which account, if a platform of strong planks were made under the chambers, there would be a less quantity of powder required for the charge of the mine. When the mine is properly loaded, the gallery is stopped up with stones, earth, and dung, well rammed, five or six feet farther from the chamber than the length of the line of least resistance. And for preventing the mine from bursting through the gallery, and to make it have its effect upwards, the gallery is made with one or two turnings, at right angles to each other, and strongly secured with buttresses and planks, and the intervals rammed with stones and earth.

Many writers have estimated the operation of mines on the false supposition, that their entonnoir, or excavation, is the frustum of a cone; and therefore, in order to estimate the weight of the matter to be blown up, they have only to compute the solidity of such a frustum in cubic fathoms, and to multiply the number of fathoms by the number of pounds of powder necessary for raising the matter it contains; and if this cone contains matters of different weights, to take a mean between them all; always having a regard to their degree of cohesion. As to the disposition of mines, there is one general rule, which is, that the side towards which one would determine the effect, be the weakest; but this varies according to occasions and circumstances.

MINES, Different Sorts of. A mine which has only one chamber is called a single mine, as A, *fig. 13*. If it has two chambers, it is called double, as *fig. 14*, and if it has three, triple, as *fig. 15*, &c. the names being taken from the number of chambers. If a single mine is made under the rampart, to make breach, the entrance O, *fig. 13*, must not be opposite to the place where the chamber is designed to be, but on one side or other; and the gallery with two turnings, that it may be stopped with greater security, and that the distance of the entrance O to the chamber A may be greater than the length of the line of least resistance: otherwise the mine would have its effect that way. It must also be observed, that the chamber is placed in the middle of a counterscarp, by which means it will make a greater breach than if it were placed in the earth behind the wall. When a double mine is made under the rampart for making breach, the entrance O, *fig. 14*, is made, as nearly as can be guessed, in the middle, between two counter-forts; the gallery being carried quite through the wall in a direct line, turns afterwards to the right and left, in the form of a T; from whence it is also called a T mine; and the chambers are also placed in the next counter-forts, but exactly at equal distances from the direct gallery: this double mine will make a much larger breach than the single one, and it is for that reason preferred to any other.

But when a triple mine is to be made under the rampart, the opening O, *fig. 15*, is to be made directly opposite to the counter-fort, if possible, and carried directly through the wall, and turned to the right and left in the same manner as the former; and the chambers A, B, at both ends, are placed in the two adjacent counter-forts. As to the gallery of the third, C, it is carried round the middle counter-fort, and the chamber placed under its extremity; this last is

generally charged with fifty pounds of powder more than either of the others; but great care must be taken to carry the auger of this last chamber in zig-zags, so as to be equal in length to that of the chamber B, otherwise the fire would not reach them all three at the same time, and thereby the chamber C not take fire, which sometimes happens, and then the effect does not answer the expectation.

There are seldom or ever more made than a triple under the ramparts in sieges; but when a work is to be demolished, they make then as many as will demolish a whole face at once; which is done by giving the fire to all at the same time; that is, all the saucissons are brought into one, and so contrived, as that their parts from the chambers to the common junction may be exactly equal. Muller's System of Artillery, &c. vol. vi. part iii. p. 206, &c.

MINE, *Chamber of a*. See CHAMBER and MINE.

MINE, *Counter*. See COUNTER-mine and MINE.

MINE, *Gallery of a*. See GALLERY and MINE.

MINE, *Knight of the*, is a military honour, anciently conferred on persons who had distinguished themselves in engagements in mines.

MINE-Ships, are ships filled with gunpowder, inclosed in strong vaults of brick or stone, to be fired in the midst of an enemy's fleet. See FIRE-ship.

MINE is also a French measure. See MEASURE.

MINE-Dial is a box and needle, with a brass ring divided into 360 degrees, with several dials graduated thereon; generally thus made for the use of miners.

MINEHEAD, in *Geography*, a township of America, in Essex county, Vermont, on Connecticut river; it is watered by Nulhegan river, and has only 27 inhabitants.

MINEHEAD, a cape of Ireland, in the county of Waterford, between Ardmore-head and Helwick-head, from the latter of which it is about four miles distant.

MINEHEAD, a sea-port town and borough, situated on the southern shore of the Bristol channel, in the hundred of Carthampton and county of Somerset, England. The town was first incorporated by queen Elizabeth, who endowed it with many valuable privileges. In the reigns of Charles II. and queen Anne, so great was the trade from this port to Ireland, that upwards of forty vessels were constantly engaged in it. Several were likewise employed in the West India, Virginia, and Straits trade; and not less than 4000 barrels of herrings were annually shipped here for the Mediterranean. The chief articles of import, besides colonial produce, were wool, linen, and cattle, and the exports consisted mostly of coals and grain. All this trade is now entirely lost; the herrings have deserted the coast, and there are at present only five or six vessels belonging to the port. In the time of its prosperity the government of this borough was vested in a portreeve, but since its decline it has been committed to two constables, who are chosen annually at the court leet of the lord of the manor. The arms of the town are a ship under sail and a wool-pack, emblematical of its pristine trade.

Minehead is divided into three parts; the Upper Town, consisting of several irregular streets, meanly built, and standing on the eastern slope of a vast hill, called Greenalagh or Minehead point; the Lower Town, situated half a mile from the beach to the south-east; and the Quay Town, placed under the brow of a lofty eminence close to the shore. The church, which is a large handsome structure, stands in the Upper Town, and is distinguished by a very elegant alabaster statue of queen Anne, on a pedestal four feet high. It was the gift of sir Jacob Banks, as appears from an inscription upon it, bearing the date 1719. At the entrance of the quay, in Quay Town, stands the Custom-house, which still con-

tinues furnished with a regular establishment of officers. A market continues to be held here every Wednesday; and there is a small manufacture of woollen cloths, which constitutes the chief support of the inhabitants. Fronting the market place is an alms-house, built and endowed by Robert Quirk, in 1630. Two members are sent from this borough to parliament, who are elected by the parishioners of Dunster and Minehead, being housekeepers and not receiving alms. The constables are the returning officers.

The country around Minehead is pleasing and beautiful, presenting to the view a series of lofty hills interspersed with rich and luxuriant vallies. The climate is so mild that vegetation is a month earlier here than in most parts of England. This circumstance has of late years induced many persons to resort hither during the bathing season, to the great benefit of the town. A peculiar species of limpet, found on the rocks here at low water, afford a very curious liquor used in marking linen, which, when first applied, exhibits a variety of changes in its colour, and ultimately, after washing, assumes a bright crimson hue, which no subsequent efforts will alter or eradicate. About six miles to the south of the town is the lofty mountain of Dunkerry, which rises 1770 feet above the level of the sea, and is 12 miles in circumference at the base. From the collections of stones bearing the marks of fire, which appear on different parts of it, it is conjectured to have been used as a beacon to alarm the country in the event of invasion. Collinson's History and Antiquities of Somersetshire, vol. ii. 4^{to}. 1791.

MINELLI, ANDREA, in *Biography*, a Venetian opera poet, and author of many dramas that were much applauded: such as "Orfeo," 1702; "Finezze d'Amore, et la forza vinta dall' Onore," 1703; "La Rodoguna," at Milan the same year; and "Il trofeo dell' innocenza," at Venice, 1704.

MINELLIUS, JOHN, was born at Rotterdam about the year 1625, and passed his life as a teacher of the learned languages. He died in 1683. He published notes upon Terence, Sallust, Virgil, Horace, Florus, Valerius Maximus, and Ovid's Tridlia, which have not only been very useful to students, but have been freely transcribed by more modern editors and commentators.

MINEO, in *Geography*, a town of Sicily, in the valley of Noto, near a lake of the same name; 24 miles S. of Catania.

MINERA, in *Medicine*, the seat, or rather matter of a disease.

The term is applied by some authors to those parts of the body wherein there are collections and coagulations of humours made; which, hardening, form obstructions, and produce diseases.

In this sense we say, the *minera morbi*, &c.

MINERALS, or FOSSILS, are those inorganic natural bodies of which the solid mass of the earth is composed. Their more remarkable properties and characters will be enumerated under the article ORYCTOGNOSY.

MINERAL, *Æthiops*. See ÆTHIOPS, and MERCURY.

MINERAL, *Turbith*. See TURBITH, and MERCURY.

MINERAL Oil See OIL.

MINERALE *Bzoardicum*. See BEZOARDICUM.

MINERAL, *Crystal*. See CRYSTAL Mineral.

MINERAL *Kermes*. See KERMES Mineral.

MINERAL Waters, are those which, at their springing for h t o m and r-ground, are found impregnated with some mineral matter; as salt, sulphur, vitriol, &c. See WATER

Such are hot baths, spas, purging, &c. springs.

MINERAL Waters, *Earth of*. See EARTH.

MINERAL Juices. See JUICES.

MINERAL Courts, *Curia mineralis*, in Law, courts for regulating the concerns of lead mines; as *flannary courts* are for tin.

MINERALOGY, the science which makes us acquainted with all the various relations under which minerals present themselves to us. This comprehensive branch of knowledge is by the illustrious Werner divided into five distinct doctrines, *viz.* 1. *Oryctology*, or that part of mineralogy which, with the assistance of well ascertained characters and fixed denominations, teaches us to determine fossil substances, and to arrange them according to their natural affinities. 2. *Geognosy*, which has for its object the structure, relative position, and formation of those substances of which the crust of the earth is composed. 3. *Mineralogical Geography*, which exhibits, in geographical order, the species of rocks that occur in different countries, together with the various species of minerals contained in them, and the circumstances under which they occur. 4. *Mineralogical Chemistry*, which makes us acquainted with the various chemical properties of minerals, and with the quality and quantity of their component parts. 5. *Economical Mineralogy*, in which mineral substances are considered merely with a view to the use to which they are applicable, which also determines their arrangement.

It is only within the last quarter of the elapsed century that the knowledge of minerals has made rapid strides towards perfection; not long before that period it could scarcely be said to have assumed the appearance of a science; and the ancients appear to have been totally unacquainted with any thing in the shape of scientific mineralogy.

The *ορυκτα* and *μιταλλευτα* of Aristotle can scarcely be considered as bearing testimony to this philosopher's knowledge of minerals, and are indeed only mentioned by him because he fancied the origin of the former might be derived from earth, and that of the latter from water. The few mineral substances treated on by Theophrastus, Pliny, Dioscorides, and Galen, intermixed with productions of art, are merely such as were employed for the common purposes of economy, and the study of these authors is far more important to the philologist and antiquary than to the mineralogist. On reading the sixth book of Dioscorides, we become indeed acquainted with part of the medical knowledge of the ancients, but it teaches us very little that might be deemed any way interesting in a mineralogical point of view. Pliny, where he treats on gems and metals, expatiates on the luxury prevalent among the Romans, and when speaking of marble, basalt, &c. enters upon the history of their productions of art, without at all adverting to the degree of knowledge they possessed of unorganized nature. Indeed, *scientific* knowledge of this kind was not among the acquirements of the ancients; and whatever may have the appearance of it in the writings of the authors above-mentioned, is so destitute of order and precision, that it is surprising how Wallerius, who well knew what is requisite for a mineralogical system, could mention Theophrastus, Pliny, Dioscorides, and Galen, as the first systematic writers in mineralogy. The knowledge of some mineral substances must, of course, be coeval with the earliest ages of the world; but to trace mineralogy, as a science, to Egypt, or to ancient Greece and Rome, is almost as absurd as to dignify Tubal Cain with the title of the first of chemists.

When the general lethargy of the sciences commenced, little regard was paid even to the scanty knowledge handed down in the works of the ancients; and it was not till the introduction of the chemistry, or rather alchemy, of the

Arabians into Europe, that a small share of attention was again bestowed on the study of unorganized bodies. Avicenna laid the foundation of the distribution of minerals, into stones, metals, sulphureous fossils, and salts; a division which was generally adopted by the chemists of those times, but not by the other naturalists; the former, to judge from a passage in Agricola (*De Nat. Fossilium*, l. i. p. xvii.), not being held in great esteem by the scholasts. "Avicenna," says Agricola, "non scienter, sed more dimissarum, sulphureo duas species subiecit: sulphur et arsenicum." Hence it is that Albertus Magnus, this superstitious transcriber of the ancients, followed quite a different distribution; for among other changes which he adopted, was that of throwing the lapa and sulphurea into one class, under the name of *Media*.

Such were the first attempts at introducing some order among the unorganized bodies. The chemists on one side proposed the component parts, which, however, far from being demonstrated, were only hypothetically assumed by them; the scholasts, on the other hand, were equally intent upon investigating and recommending the characters derived from the external form of minerals, their supposed medicinal properties and miraculous virtues. This twofold view of the subject characterizes the writings of almost all succeeding mineralogical authors, down to a period not far remote from the present; we find them either implicitly adopting the ideas of the chemists, or announcing themselves as mere empirical collectors of curiosities. Agricola, the first systematic mineralogical writer, may, indeed, be considered as an exception to this rule. He directed his thoughts to the uniting the views of these two classes of writers, although he certainly inclined more to those of the second.

Agricola was the first who paid attention to external characters, which were determined by him with tolerable precision, and employed for the distinction of the mineral substances then known. All fossils (*corpora subterranea*) are divided by him into simple, or such as consist of homogeneous particles; and into compounded, or such as are formed of heterogeneous parts, taken in a mineralogical acceptance of the terms. The minerals belonging to the former of these divisions are found in four different forms, which are, 1. Terra. 2. Succus concretus. 3. Lapis. 4. Metallum. *Terra* he defines as "corpus fossile quod potest manu subigi, cum fuerit asperum humore, aut ex quo, cum fuerit modofactum, fit lutum." These earths he divides partly according to some external characters, partly after their localities, in cases where their names are derived from the countries or places in which they are found. "*Succus concretus* est corpus fossile siccum et subdurum, quod aqua asperum aut non mollitur, sed liquefit, aut, si mollitur, multum vel pinguitudine differt a terra, vel materia ex qua constat." The fossils of this class Agricola divided into macra and pingua; the former consist of a juice partly mixed with earth (sal nitrum), partly with metal (chrysolita, arugo, ferrugo, caruleum), partly mixed both with earth and metal (atramentum iutorium, alumen, &c.): to the latter he refers sulphur, bitumen, fardarach, and auripigmentum. The ambiguity of this definition, and the impropriety of placing in one and the same class substances so very distinct from each other, require no comment. The stones are the third class of Agricola's system. "*Lapis* est corpus fossile siccum et durum, quod vel aqua longinquo tempore vix mollit, ignis vehemens redigit in pulverem; vel non mollit aqua, sed maximo ignis liquefit calore." The stones are subdivided into lapis, gemma, marmor, and saxum. His definition of metals, being his fourth class, is, "*corpus fossile natura vel liquidum vel durum quidem, sed quod*

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ignis liquefcit calore." He enumerates ten metals. The laft clafs of Agricola's fyftem comprehends mixed and compound foſſils. 1. Mixtures of ſtones and juices (*fucci*). 2. Of earth and metal. 3. Of ſtone and metal. 4. Of juice, ſtone, and metal. To the ſecond and third diviſion he refers the various ores. What has been ſaid may convey an idea of Agricola's ſyſtematic knowledge in mineralogy. Conſidered as a firſt eſſay, his ſyſtem is indeed very valuable, and more logical precision in its execution can ſcarcely be expected from its author; but, on the other hand, it cannot be denied that he was often ſtrangely led aſtray by his deficiency in chemical knowledge, nor did he even ſuſpect that the preſervation of unity is at all required in the conſtruction of a ſyſtem.

Moſt of the ſyſtematic mineralogical writers who ſucceeded Agricola were chemiſts, or rather alchemiſts; but even theſe adopted his ſyſtem, although it was more or leſs altered by ſome of them. Thus, Cardanus retained the "*fucci concreti*," but he followed the chemiſts in ſeparating the ſalts from the bitumens.

Kentmann, who published in 1569 his book "*De omni rerum foſſilium genere*," was a nomenclator who adopted Agricola's ſyſtem almoſt without making any alteration. The earths and the *fucci concreti* are, however, ſubdivided in a different manner, and a treatiſe on petrifications is added, entitled "*Alcyonia, conchæ et alia, quæ ex falſo liquore maris et ex ejus ſpuma, cum tenuiſſimis foribus permixta concreſcunt*."

The celebrated botaniſt, Cæſalpinus, was the firſt who properly ſeparated the ſalts from the inflammable foſſils. The diviſions of his ſyſtem are, 1. *Mineralia humore ſolubilia*, to which he refers the earths and ſalts. 2. *Oleo ſolubilia*, which contains the ſulphureous ſubſtances with orpiment. 3. *Illiquabilia*, comprehending the rocks, and all other ſtones, as alſo corals, animal calculi, &c. 4. *Liquabilia*, or metals.

Aldrovandus, that voluminous writer, compiled his ſyſtem from Agricola, Cardanus, and Cæſalpinus. With him the petrifications begin to be conſidered as objects of curioſity.

Befides the many authors of that period, who buſied themſelves by arranging the minerals of the ancients according to Agricola's ſyſtem, which they now and then altered conformably to the ſuppoſed diſcoveries of the day, there were ſome who, although not ſyſtematic writers themſelves, had conſiderable influence on the ſyſtems of ſucceeding periods. Among theſe was the famous Jeſuit, Athanaſius Kircher, who (in his *Mundus ſubterraneus*, Amſterd. 1678) ſurpaſſed all his precuſors in the amaſſing of wonderful curioſities and *luſus naturæ*; although Jonſton had not been remiſis in affixing much importance to the ſtrange forms repreſenting celeftial and ſublunary bodies, preſented to the world in his "*Notitia regni mineralis*," which appeared at Leipzig in 1661.

Of greater importance were the advantages which the ſcience of mineralogy derived from the investigations of Beccher. This mineralogiſt (in his "*Phyſica ſubterranea*," firſt published in 1667,) conſidered water and earth as the remote, and vitreous, inflammable, and mineral earths (ſal, ſulphur, mercurius), as the proximate conſtituent parts of all minerals, which he accordingly arranged under three claſſes; the firſt comprehending ſuch ſtones in which the vitreous earth conſtitutes the principal ingredient; the ſecond and third claſs containing the ſubſtances in which the two remaining earths predominate. Though the principles which thus formed the baſe of his ſyſtem were derived from gratuitous aſſumption, yet they ſerved to prove the poſſibility of a chemical arrangement of the genera, and of applying

the differences obſervable in the conſtituent parts of the earths and ſtones as fit characters for diſtinguiſhing them.

The ſtones Beccher divides into thoſe that either calcine or vitrify in the fire; thoſe that preſerve their ſolidity, or become friable when ignited; and thoſe that, when ignited and immerſed in water, either remain ſolid or crumble to pieces. In his work, we for the firſt time find antimony, zinc, and biſmuth, (though, indeed, alſo pyrites,) introduced as imperfect or ſemi-metals. The perfect metals, of which he has fix in number (for mercury he conſiders as a *decompoſitum*), are claſſed after the following characters: two of them (gold and ſilver) melt in a red heat; two (copper and iron) are red-hot before they melt; and two (tin and lead) melt before they can be heated to redneſs.

The next in ſucceſſion are the *decompoſita*, or ſuch minerals as are compoſed of ſeveral earths and ſtones, earths and metals, &c., or of ſeveral ſpecies belonging to the ſame claſs, ſuch as mixtures of metals; and they are divided into *terrea, lapidea, metallica, and aquea*.

Bromelius (who published a book intitled "*Catalogus rerum curioſarum*," Gothæburg, 1698,) began to refer to the ſame claſs ſulphur and the bituminous ſubſtances, which he called *ſulphurea* and *pinguia*: he retained Beccher's diviſion of metallic ſubſtances into perfect and imperfect metals.

Nor ſhould the Swediſh mineralogiſt Hiärne be left unnoticed here, who introduced ſeveral changes into the then prevailing ſyſtem of mineralogy: thus, for inſtance, he was the firſt who ſeparated the common from arſenical pyrites, which before him had conſtantly been united by authors. Like Bromelius he places ſulphur and the bituminous ſubſtances in the ſame claſs; an arrangement which has been retained by all ſucceeding ſyſtematic writers in mineralogy: and though the term "*fuccus concretus*" continued to be employed by ſome of them, it was always uſed as a ſynonym of ſalt.

Towards the cloſe of the 17th century Woodward publiſhed his catalogue of minerals. His knowledge of mineralogy was ſuperior to that of any other Engliſh author of his time.

Of the mineralogiſts of the beginning of the 18th century, the moſt celebrated were Beyer, Bütner, and Scheuchzer. Theſe authors, who were leſs ſuperſtitious and more to be depended upon than Aldrovandus and Kircher, principally preſented the world with their obſervations on petrifications. The two latter, however, were not quite free from prejudice; they introduced an exceſs of biblical teleology into the mineralogical ſcience, and moſt of their obſervations were made with a view to the univerſal deluge. But it is not to be denied that all three contributed largely towards directing the attention of mineralogiſts to the ſtructure of mountain rocks. All the mineralogical writers that had preceded them were chemiſts, practical miners, or at beſt mere oryctognoſtians: but about this period naturaliſts began to examine rocks with other than merely metallurgical views; mineralogy was found ſuſceptible of being treated in a ſcientific manner, and it began to go hand in hand with the other branches of phyſical knowledge. Even Scheuchzer and Beyer, and ſome other authors of thoſe times, by not conſining themſelves to the mere collecting of petrifications, but alſo conſidering them as veſtiges of important revolutions, had opened a new field of investigation to the thinking naturaliſt.

Magnus von Bromell, a Swede and pupil of Hiärne and Boerhaave, publiſhed a ſyſtem of mineralogy, (*Inledning til kundſcåb om Mineralier, &c.* Stockh. 1730,) in which he not only availed himſelf of all the improvements made by his maſters, but alſo propoſed a new chemical diviſion of ſtony ſubſtances into ſuch as are refractory (*apyri*), or calcinable,

or vitrescible, in the fire; to which were added the figured stones (*figurati*.)

After Von Bromell, Linnæus appeared, and it is chiefly from this period that the origin of systematic mineralogy may be dated, when our science, together with the other branches of natural history, acquired a degree of popularity which it had never before enjoyed. It has been questioned whether Linnæus himself contributed to the advancement of the science; and some writers have even denied him any knowledge in this department of natural history. But the fact is that in his earlier years Linnæus devoted a considerable share of time to the study of mineralogy, and whatever his merits in framing his mineralogical system may be, certain it is that it bespeaks the same acuteness and the same original mode of thinking, which we so much admire in the other works of this illustrious naturalist. His mineralogical arrangement cannot, indeed, be compared with the masterly systems of zoology and botany, and it even appears that he added it chiefly for the sake of completing his grand work of a general system of nature. It has been justly urged against the applicability of his system, that it is founded on an erroneous principle, *viz.* on the supposition that the crystalline form of mineral substances is due to different salts, and that they are to be classed accordingly; but even this erroneous notion served to direct the attention of the student to the important characters derived from the diversity of crystallization, of which subsequent mineralogists availed themselves with signal success, for the distinction and classification of mineral substances. (See *CRYSTALLIZATION*.) If, moreover, we consider the advantages which necessarily accrued to mineralogy by those general principles that were introduced into natural history by Linnæus, the precision of his terminology, his philosophical views of classification, &c., all of which were equally applicable to our science, it can no longer be a matter of doubt that the labours of the great Swedish naturalist have, at least indirectly, been of essential service to the advancement of this important branch of natural knowledge.

The chemical part of mineralogy began, about this period, to be cultivated with great success. The discoveries of Henkel and Pott, who (if we except Hiärne, and perhaps Beccher) may be looked upon as the first mineralogical chemists, had clearly demonstrated the important advantages which mineralogy may derive from chemistry. The external characters were almost entirely rejected by Henkel as vague and unsatisfactory. In his "*Idea Generalis de Lapidum Origine*," the inflammable mineral substances (to which, however, he refers also vegetable gum and phosphorus) constitute a separate class; the class of salts contains acids, alkalies, and neutral salts, and the alkaline are kept distinct from the earthy, and the latter from the metallic neutral salts; the earths he divides in the same manner as Beccher, and he subdivides them after the degree of heat required for their fusion; the class of stones comprises the calcareæ, siliceæ, calcareo-siliceæ or limosæ; a classification which he proposes with great modesty, although it may indeed be considered as a great step in mineralogical chemistry. Henkel's "*Kies-Historie*" (*History of Pyrites*), considering the period in which it was written, displays an uncommon degree of accuracy, and contains, as well as others of his works, valuable contributions towards the natural history of various metallic substances, and their ores.

More accurate chemical knowledge marks the works of the celebrated Pott, who, on account of the valuable discoveries illustrative of mineralogy, may justly be called the Klaproth of the period in which he flourished. No mineralogist before him had so clearly demonstrated that it is the

degree of hardness alone which distinguishes earths from stones, and that this property, infinitely variable in various substances, cannot furnish a principal distinctive character for their classification. Profound chemical knowledge and uninterrupted application enabled him to subject the simple earths to a closer examination, to determine their character with greater precision, and also to augment their number. His classification of the earths, which, with some alterations, justly became a standard for his successors, is the following:—
1. *Alcaline earth*, which may be burnt into quick-lime, and is soluble with effervescence in the acids. 2. *Siliceous earth*, little alterable by calcination, and insoluble in acids: this he considered as the principal cause of hardness of the stones in which it predominates. In his "*Lithogeoognosie*," Pott called this latter "*vitrescible*" earth; but finding afterwards that the property which gave rise to it is common to all the earths, he discontinued the name. 3. *Argillaceous earth*, which, on account of its viscidness and ductility, is susceptible of being turned on the lathe, becomes hard in the fire, and is insoluble in the acids. 4. *Gypsous earth*, which by burning is converted into gypsum, which resists the acids, and is difficultly vitrifiable. The species of earthy fossils were distributed among these classes, according as one or the other of the above earths formed the predominant constituent part in them. Had this great chemist lived to extend to the metals the same strict examination to which he subjected the earths and stones, mineralogy would undoubtedly, in his time, have arrived at that perfection which afterwards resulted from the laborious experiments of succeeding chemical mineralogists.

Nearly about the same time Wallerius published his system of mineralogy (*Mineral-rike indelt och beskrievit*, Stockholm 1747), in which, as the discoveries of Pott were not then known to him, he adopts the classification of the older mineralogists, separating earths from stones, the former of which he divided into pulverulent earths (*terræ macræ*), argillaceous earths (*terræ pingues*), mixed earths (*terræ minerales s. compositæ*), and sand (*arenæ*); the latter (with Bromell the younger) into lime-stones (*calcarei*), vitrifiable stones (*vitrescentes*), refractory stones (*apyri*), and rocks (*saxa*). The substances of the third class of his system are called *minera*, comprehending saline ores (*salia*), inflammable substances (*sulfura*), and metals. The fourth class contains the concretions (*concreta*), which are subdivided into stactical substances (*pori*), petrifications (*petrificata*), figured stones (*figurata*), and calculi.

This work of Wallerius was a welcome present to the mineralogical world. The genera before its appearance were extremely vague, and the external characters pointed out in the descriptions were insufficient for the determination of a given fossil substance; it was indeed required to be previously acquainted with minerals in order to understand the systematic works, and the knowledge of fossils was propagated more by tradition than by scientific instruction. One of the chief objects of *oryctognoy*, the determining a given fossil from description alone, even without any previous practical knowledge of mineral substances, was in a great measure attained by this new work of Wallerius; the utility of which was greatly enhanced by the addition of a correct and critical synonymy of preceding mineralogists. But however great the advantages which accrued to the science by the labours of this excellent mineralogist, his system was still, in many parts, essentially defective: thus, for instance, the characters of the first, second, and fourth classes were derived from the external form, those of the third, on the other hand, from the mode of occurrence of the substances which it contains; the orders are chemically determined in the three first

classes, while those of the fourth class are derived from the form, and even the origin of the minerals referred to it. Nothing can be more vague than the definition he gives of concretions, which to him are "mineral substances composed of a fossil and common matter, formed in the usual manner, but hardened, and, as it were, cemented, either by fire or water, and therefore different from other minerals in their origin, figure, and the localities in which they occur."

Woltersdorf, a pupil of Pott, proposed to frame a system, embracing the whole mineral kingdom, in the manner of his master's system of lapideous substances; but his chemical knowledge appears to have been inadequate to the task which he undertook: his system, therefore, not being sufficiently supported by experiments, shared the fate of all attempts at natural arrangement not founded on actual observation, and proved abortive.

Pott's discoveries had paved the way to a more judicious and proper mode of framing classes and orders in mineralogy. In the same manner as botanists, in former times, separated trees from plants, mineralogists, equally misled by an apparently important external character, had kept the stones distinct from the earths; it was principally Pott who shewed the impropriety of this separation, and also that both earths and stones are divisible into several genera, according to the greater or less proportion they contain of the several chemically simple earths. The idea now presented itself, that perhaps in future the genera might be successfully determined after the number of earths which enter the composition of each, and that this principle of classification might be made subservient to the preservation of unity of the system. The salts were already arranged, also in the mineralogical systems, according to their more obvious chemical differences. To the class of metallic substances all such minerals were referred as chiefly contained metals, and the mineralized ores were no longer separated from the native metals. On the other hand, the writers on petrifications, Bourguet, d'Argenville, &c. still followed closely the footsteps of Scheuchzer. *Lusus nature*, fossil productions imitative of organic structure, still occupied a conspicuous place in their arrangements, from which no systematic writer had yet dared to exclude them. To do this was reserved for Cronstedt.

With Cronstedt begins the second principal era of the science of mineralogy, if the first is to be dated from Agricola. In his work (*Forfög til Mineralogie, &c. Stockh. 1758*), he sets out with giving some highly interesting and important observations on the gradual effects of fire and water on minerals, and on the slow but unintermitted changes they experience by physical and chemical agents in the bowels of the earth.

The minerals are divided by Cronstedt into earths, bitumens, salts, and metals. The earths are subdivided according to the difference in their mixture, as far as it was then known, into the following nine orders:—1. Calcareous stones; to which order also gypsum is referred. 2. Siliceous substances. 3. Granitic substances (garnet, basalt, shorl.) 4. Argillaceous substances. 5. Micaceous substances (mica, talc.) 6. Fluoric substances (fluor spar.) 7. Asbestine substances. 8. Zeolite, to which he refers also the lapis lazuli. 9. Manganesian substances (manganese, wolfram.) The salts are classed according to the acids or alkalis. The class of inflammables, which till then had been but little elucidated, has hardly undergone any alterations. He has, however, added the plumbago or graphite to it. The class of metals comprehends as many genera as simple metals were known in the author's time. For the first time we find here the then newly discovered platina, and also nickel, one of Cronstedt's own discoveries.

One of the principal and most striking advantages of this system, is the strict unity observed in the principle of classification, which is throughout chemical; and the principles on which these classes and orders are established are still pretty generally acknowledged as genuine by the systematic mineralogists of the present day. The garnets were not separated by Cronstedt, from supposing them to contain a peculiar earth; on the contrary, he himself considers them as a mere variety of iron-shot quartz, and the separation was suggested by some peculiarities of external and physical characters presented by the garnets and shorls, the component parts of which were not as yet known to him. This unacquaintance with the constituent parts, and their peculiar chemical properties, likewise induced him to separate mica, talc, asbest, fluor, zeolite, and azur stone, manganese and wolfram from the other earths: though he actually suspected that the two former of these substances contained argillaceous earth, and that manganese and wolfram were known metals. Soon after, a new acid was discovered in fluor spar, a new earth in talc and asbest, and new metals in manganese and wolfram. In some instances he has deviated from the unity of his classification, particularly in the class of inflammable substances, to which, probably, on account of its use, iron pyrites is referred, though it does not display those properties which are mentioned as characteristic of that class. As, on one hand, Cronstedt's system is enriched with many new species, so, on the other hand, this mineralogist properly rejected a great number of substances, which occupied a conspicuous place in the writings of his predecessors; for instance, the *lusus nature*, figured stones, &c. He also shewed that petrifications cannot claim a separate place in the system merely because they have retained part of their original form; as also that compound mountain rocks are not admissible into a system which comprehends mineralogically simple substances. Both these natural productions are treated on in an appendix.

No work on mineralogy ever created greater sensation than that of Cronstedt. A short time after its appearance, it was translated into almost all European languages, the system was studied in all civilized countries, and with some occasional, often unnecessary deviations, was adopted by all writers on mineralogy. Yet with all this, Cronstedt's system is not without its great defects: thus, for instance, it is a matter of great difficulty to become acquainted with a mineral substance by consulting the description he gives of it. Cronstedt improved the classification of minerals, but the task of giving the greatest possible perfection to description, so indispensably necessary for the diagnosis of fossils, was reserved for succeeding mineralogists. He even neglected those external characters which were known and adopted in his time; but these, it must be confessed, were, for the greatest part, unsettled and vague.

At the same time with Cronstedt's Mineralogy, or immediately after, Lehmann and Vogel published their Systems, which, however, did not contribute much to the advancement of the science.

Marggraf demonstrated the peculiar nature of magnesian earth, which became the foundation for a new order of earthy substances. His writings contain, moreover, many discoveries highly important to chemistry, but which it is not necessary to detail in this place.

Wallerius was the first by whom the principles on which systematic writers had hitherto arranged mineral substances, were subjected to a strict examination. He rejected all characters derived from the value, use, and geognostic situation, and established it as a rule, that the orders and genera should be founded on chemical characters alone, while the species

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species should principally be determined by their external characters. This principle has been employed in the new edition of his "Mineralogical System," published at Stockholm in 1772. This is a measure of so mineralogical writer before him had been equally correct and precise. His external characters, combined with the chemical ones then known enabled the student, at least in some measure, to discriminate minerals by means of these improved determinations. The genera, too, were distinguished by him with greater precision, and augmented with many new ones. In these respects Wallerius holds a most distinguished place among mineralogical writers, and his work still deserves to be consulted by the student in oryctognosy. It cannot, however, be denied that his terminology is still much too vague, and his external characters far from being sufficiently complete; for, as Werner very justly remarks, description is one of the principal objects of oryctognosy, and it is better to see a mineral badly arranged and well described, than well arranged and badly described. But even in his arrangement Wallerius has fallen into errors, which latter discoveries might have taught him to avoid. In separating earths from stones he is not even faithful to his own principles of classification; and the reasons he assigns for so doing are, indeed, very unsatisfactory. His retaining the faulty division into vitreous and fixed stones, his referring to one and the same class the salts, the sulphureous and bituminous substances, together with the metals, were among the more important defects in his classification.

It was about this time that Engström, by pointing out a more convenient method of trying some of the chemical properties of minerals by subjecting them to the flame urged by the blowpipe, greatly contributed toward facilitating the diagnosis of minerals, especially that of metallic substances.

Werner now published his classical work on the external characters of minerals, (*Von den äussern Kennzeichen der Fossilien*, Leipzig 1774,) upon the appearance of which the vague terminology which had, till then, rendered description almost useless, gave way to a settled and determinate language, and the foundation was laid of a system which has deservedly procured its framer the title of the father of systematic mineralogy. In the work just mentioned, all characters are described with uncommon precision, which may appear pedantic to those who are ignorant of the salutary effects which this very circumstance has on the discrimination of minerals. In 1780, Werner published a German translation of Cronstedt's Mineralogy, accompanied with notes, in which he makes us acquainted with his ideas respecting a system of oryctognosy. This was followed, in 1791, by a descriptive Catalogue of the Mineral Collection of M. Pabst von Oheim, in which we have the first authentic sketch of his system. These two works, and some highly interesting memoirs in "The Bergmännische Journal," and some other periodical publications, is all that has been published by this great and modest mineralogist. All the explications of his system which we possess are by his pupils; they are of various merit, and some of them are but ill calculated to convey an adequate idea of its excellencies. The late Mr. Kirwan, in his "System of Mineralogy," (a work of peculiar merit, on account of the many original observations which it contains) was the first who made the Wernerian system known in England; and after him professor Jameson, a distinguished pupil of the Freiberg school, has published an elaborate work in three volumes, the two first of which contain the system of oryc-

to-gnosy according to the method of Werner, the third giving a complete exposition of his system of geognosy.

The fundamental principle laid down by Werner, in the systematical arrangement of bodies, is their natural affinity, which he all ways to be founded on the chemical mixture of their component parts. These may be distinguished into essential and accidental component parts; the former of which alone are considered in the classification of mineral substances. The essential component parts are subdivided into predominant and characteristic ones; and generally the characteristic happen to be, at the same time, the predominant constituents. By Humboldt the former are called the essential constituent parts. All mineral substances are distributed by Werner into four classes, which are founded on what is called the fundamental constituent parts, *viz.* the earthy, saline, inflammable, and metallic; each class being called after that fundamental constituent part which predominates in and characterizes it. Thus we have the earths, the salts, the inflammables, and the metals. These classes are subdivided into genera, which are derived from the variety in the component parts of the minerals comprehended in each class; there being as many distinct genera as there are predominating, or, at least, characteristic constituent parts discovered in their mixture. Werner has himself disregarded this rule in several instances, and we suppose has now even entirely discontinued the division into genera; at least, several of his pupils have, in their systematic works, introduced *families* as the only division between class and species; each family being a group of species that manifest close affinity to each other, such as the "Feldspar family," the "Zeolite family" &c. By this means the system is so far freed from the shackles of chemistry, and the contradictions are avoided, which so frequently strike the student of the Wernerian system. In the same manner perhaps, also, the species might in some measure be made independent of chemistry. The character of the species, according to the original idea of the founder of this system, was to be derived from the chemical mixture, and from the differences in the quantity and quality of the constituent parts. But in most cases, where no analyses existed of minerals, or no satisfactory ones, external characters were substituted the more readily, as it is an axiom with Werner that a difference in external characters is indicative of a corresponding difference in the component parts, whether it be in their quantity and quality, or in the particular state of their chemical combination. If, therefore, a mineral differs from another related substance in three or more external characters, it is now considered as a distinct species. This circumstance accounts for the considerable number of species in the Wernerian system, compared with those of Haüy's, whose characters employed for specification are confined within a far more narrow compass. We shall shew in another place, that the laws for framing species in mineralogy, whatever the characters may be on which they are founded, must always be arbitrary: but fortunately for the science, the different opinions entertained by different schools respecting the nature of the species, is a mere matter of speculation, exerting little or no influence either on the diagnosis or the arrangement of mineral substances: for, provided the natural connection between two mineral substances remain undisturbed, it is certainly of no great importance whether one of them be degraded into a mere variety of its neighbour, or raised to the rank of a distinct species. Werner enumerates three different kinds of affinity of minerals, *viz.* the chemical, depending on the similarity of their constituent parts; the oryctognostical, consisting in the approximating

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resemblances of their external characters; and the geognostic affinity, denoting similarity in occurrence, relative age, &c. The species is subdivided by Werner into *subspecies* and *variety*: by the former are meant fossils belonging to the same species with another, but differing from it in two or three particular external characters; the latter is produced by the difference in any single external character, such as colour, fracture, &c.

The following is a tabular view of the Wernerian oryctognostic system, according to the improvements it has experienced up to 1803; to which are subjoined the additions lately made by its founder.

Class I. EARTHY FOSSILS. A. *Diamond Genus*: 1. Diamond. B. *Zircon Genus*: 2. Zircon. 3. Hyacinth. 4. Cinnamon-stone. C. *Flint Genus*: *Chrysolite Family*: 5. Chrysoberyl. 6. Chrysolite. 7. Olivine. 8. Cocco-lite. 9. Augite. 10. Pistacite. 11. Vesuvian.—*Garnet Family*: 12. Leucite. 13. Melanite. 14. Garnet; noble, common. 15. Staurolite. 16. Pyrope.—*Ruby Family*: 17. Spinelle. 18. Sapphire. 19. Emery. 20. Corundum. 21. Diamond spar. 22. Ceylanite. 23. Topaz.—*Shorl Family*: 24. Euclase. 25. Emerald. 26. Beryl; noble, shorlous. 27. Shorl; common. Tourmaline. 28. Axinite.—*Quartz Family*: 29. Quartz amethyst; (common, thick fibrous). Rock crystal. Milk quartz. Common quartz. Prase. 30. Iron flint. 31. Hornstone; splintery, conchoidal, wood-stone. 32. Flint slate; common, Lydian-stone. 33. Flint. 34. Calcedony; common, carnelian. 35. Hyalite. 36. Opal; noble, common, semi-opal, wood-opal. 37. Menilite. 38. Jasper; Egyptian (red, brown), striped, porcelain, common (conchoidal, earthy). 39. Heliotrope. 40. Chrysoptase. 41. Plasma. 42. Cat's-eye.—*Pitch-stone Family*: 43. Obsidian. 44. Pitch-stone. 45. Pearl-stone. 46. Pumice.—*Zeolite Family*: 47. Prehnite; fibrous, foliated. 48. Zeolite; mealy, fibrous, foliated, radiated. 49. Cubicite. 50. Cross-stone. 51. Lomonite. 52. Schmelzstein (Dipyre, H.) 53. Natrolite. 54. Lazulite. 55. Azure-stone.—*Feldspar Family*: 56. Andalusit. 57. Feldspar; adularia, Labrador, common, (fresh, disintegrated), compact, hollow spar. 58. Scapolite. 59. Arctizite. 60. Spodumene. 61. Ichthyophthalmite.—D. *Clay genus*: *Clay Family*: 62. Pure clay. 63. Porcelain earth. 64. Common clay; loam, pipe-clay, potters' clay, (earthy,) variegated, and slate-clay. 65. Clay-stone. 66. Adhesive slate. 67. Polishing slate. 68. Tripoli. 69. Float-stone. 70. Alum-stone.—*Clay-slate Family*: 71. Alum-slate; common, glossy. 72. Bituminous shale. 73. Drawing-slate. 74. Whet-slate. 75. Clay-slate.—*Mica Family*: 76. Lepidolite. 77. Mica. 78. Pinite. 79. Pot-stone. 80. Chlorite; chloritic earth, chlorite slate, common and foliated chlorite.—*Trap Family*: 81. Hornblende; common, Labrador, basaltic, hornblende slate. 82. Basalt. 83. Wacke. 84. Clink-stone. 85. Iron-clay. 86. Lava.—*Lithomarge Family*: 87. Green earth. 88. Lithomarge; friable, indurated. 89. Rock-soap. 90. Umbra. 91. Yellow earth.—E. *Talc Genus*: *Soap-stone Family*: 92. Native magnesia. 93. Bole. 94. Meerschaum. 95. Fullers'-earth. 96. Steatite. 97. Bildstein.—*Talc Family*: 98. Nephrite; common, axe-stone. 99. Serpentine; common, noble, (conchoidal, splintery). 100. Schillerstein. 101. Talc; earthy, common, indurated. 102. Asbest; rock-cork, amianth, common asbest, rock-wood.—*Asimote Family*: 103. Kyanite. 104. Strahlstein; asbestous, common, glassy. 105. Tremolite; asbestous, common, glassy. 106. Salite.—F. *Lime-stone Genus*: *Carbonats*: 107. Rock-milk. 108. Chalc. 109. Lime-stone; compact, (common, roe-stone), foliated, (granular, calc. spar), fibrous, (com-

mon, calc. sinter,) pea-stone. 110. Lime-tuff. 111. Foam earth. 112. Slate-spar. 113. Brown spar; foliated, fibrous. 114. Schaalstein. 115. Dolomite. 116. Rhomb spar. 117. Stink-stone. 118. Marl; marl-earth, indurated m. 119. Bituminous marl-slate. 120. Arragon.—*Phosphats*: 121. Appatite. 122. Asparagus-stone. 123. Phosphorite.—*Fluats*: 124. Fluor; compact, F. spar.—*Sulphats*: Gypsum; earthy, compact, foliated, fibrous. 126. Selenite. 127. Anhydrite. 128. Cube spar.—F. *Baryte Genus*: 129. Witherite. 130. Heavy spar; earthy, compact, granular, curved lamellar, straight lamellar, columnar spar, prismatic spar, Bolognese spar.—G. *Strontian Genus*: 131. Strontian. 132. Celestine; fibrous, foliated.—H. *Halite Genus*: 133. Boracite. 134. Cryolite.

Class II. FOSSIL SALTS.—*Carbonats*: 135. Natural soda.—*Nitrats*: Natural nitre.—*Muriats*: Natural rock-salt; rock-salt, (foliated, fibrous,) lake-salt. 138. Natural sal-ammoniac.—*Sulphats*: 139. Natural vitriol. 140. Hair-falt. 141. Rock-butter. 142. Natural Epfom-salt. 143. Natural Glauber-salt.

Class III. INFLAMMABLE FOSSILS.—*Sulphur Genus*: 144. Natural sulphur; common, volcanic.—*Bituminous Genus*: 145. Mineral oil. 146. Mineral pitch; elastic, earthy, slaggy. 147. Brown coal; bituminous wood, earth coal, alum earth, common brown coal, moor coal. 148. Black coal; pitch coal, columnar, slaty, foliated, coarse, cannel coal.—*Graphite Genus*: 149. Glance coal; conchoidal, slaty, scaly, compact. 151. Mineral charcoal.—*Resin Genus*: Amber; white, yellow. 153. Honey-stone.

Class IV. METALLIC FOSSILS.—*Platina Genus*: 154. Native platina.—*Gold Genus*: 155. Native gold; gold-yellow, brass-yellow, greyish-yellow.—*Mercury Genus*: 156. Native mercury. 157. Native amalgam; semi-fluid, solid. 158. Mercurial horn-ore. 159. Mercurial liver-ore; compact, slaty. 160. Cinnabar; dark, light-red.—*Silver Genus*: 161. Native silver; common, auriferous. 162. Antimonial silver. 163. Arsenical silver. 164. Corneous silver-ore. 165. Silver black. 166. Silver glance. 167. Brittle silver glance. 168. Red silver-ore; dark, light. 169. White silver-ore. 170. Black silver-ore.—*Copper Genus*: 171. Native copper. 172. Copper glance; compact, foliated. 173. Variegated copper-ore. 174. Copper pyrites. 175. White copper-ore. 176. Grey copper-ore. 177. Copper black. 178. Red copper-ore; compact, foliated, capillary. 179. Tile ore; earthy, indurated. 180. Copper azure; earthy, indurated. 181. Malachite; compact, fibrous. 182. Copper green. 183. Iron-shot copper green; earthy, slaggy. 184. Copper emerald. 185. Copper mica. 186. Lenticular ore. 187. Olive ore. 188. Copper muriat.—*Iron Genus*: 189. Native iron. 190. Iron pyrites; common, radiated, hepatic, capillary. 191. Magnetic pyrites. 192. Magnetic iron-stone; common, arenaceous. 193. Iron glance; common, (compact, foliated,) micaceous. 194. Red iron-stone; red iron-froth, ochrey and compact red iron-stone, red hematite. 195. Brown iron-stone; brown iron-froth, ochrey and compact iron-stone, brown hematite. 198. Clay iron-stone; reddle, columnar, lenticular, jaspersy, common, reniform, and piliiform clay-stone. 199. Bog iron-ore; morafs-ore, swamp-ore, meadow-ore. 200. Blue iron-earth. 201. Pitchy iron-ore. 202. Gadolinite. 203. Green iron-earth. 204. Cube-ore.—*Lead Genus*: 205. Galena; common, compact. 206. Blue lead-ore. 207. Brown lead-ore. 208. Black lead-ore. 209. White lead-ore. 210. Green lead-ore. 211. Red lead-ore. 212. Yellow lead-ore. 213. Lead-vitriol. 214. Lead-earth; coherent, friable.

friable.—*Tin Genus*: 215. Tin pyrites. 216. Tin-stone. 217. Wood-tin.—*Bismuth Genus*: 218. Native bismuth. 219. Bismuth glance. 220. Bismuth ochre.—*Zinc Genus*: 221. Blende; yellow, brown, black. 222. Calamine.—*Antimony Genus*: 223. Native antimony. 224. Grey antimony; compact, foliated, radiated, plumose. 225. Black antimony. 226. Red antimony. 227. White antimony. 228. Antimony ochre.—*Cobalt Genus*: 229. White cobalt ore. 230. Grey cobalt ore. 231. Cobalt glance. 232. Black cobalt ochre; earthy, indurated. 233. Brown cobalt ochre. 234. Yellow cobalt ochre. 235. Red cobalt ochre; cobalt crust, cobalt bloom.—*Nickel Genus*: 236. Copper nickel. 237. Nickel ochre.—*Manganese Genus*: 238. Grey manganese ore; radiated, foliated, compact, earthy. 239. Black manganese. 240. Red manganese.—*Molybdena Genus*: 241. Molybdena.—*Arsenic Genus*: 242. Native arsenic. 243. Arsenical pyrites; common, argentiferous. 244. Orpiment; yellow, red. 245. Arsenic bloom.—*Scheele Genus*: 246. Tungsten. 247. Wolfram.—*Menachine Genus*: 248. Menachan. 249. Octahedrite. 250. Rutile. 251. Nigrine. 252. Iserine.—*Uran Genus*: 253. Pitch ore. 254. Uran mica. 255. Uran ochre.—*Sylvan Genus*: 256. Native sylvan. 257. Graphite ore. 258. Yellow sylvan ore. 259. Black sylvan ore.—*Chrome Genus*: 260. Acicular ore. 261. Chrome ochre.

Werner has since added several new species to this list, and from the place assigned to one or two of them in the arrangement, it follows that this latter must also have undergone some slight alterations. Thus zoisite is placed between pistacite and axinite, which in the above tabular view are placed at some distance from each other. Augite is divided into common, foliated, conchoidal, and granular; and, as next species to it, the coccolite is added. The Siberian green garnet forms a distinct species next to garnet, under the name of grossular. To the same natural family, Werner has now also added the cinnamon stone, (which, after Lam-padius' incorrect analysis, had before been placed in the zircon genus,) and the allochroit of d'Andrada. Between plasma and cat's eye, the festslein or elæolite of Klaproth is placed. The species pumice is divided into three sub-species, common, glassy, and porphyritic p. The dichroïte of Cordier is added, as iolite, to the pitch-stone family. The blue feldspar of Stiria now forms a species distinct from, but next to feldspar, under the name of blau-spath. A variety of compact feldspar (jade of Saussure) is called variolite. Porcelain earth now stands next to feldspar, from which it originates. Also the meionite and sommit are united with this family. Potters' clay is now sub-divided into earthy (formerly called pipe-clay) and slaty. To the three sub-species of strahlstein or actinote is added a fourth, the granular. Silver-black is divided into friable and indurated. What was called capillary iron pyrites, has, by Klaproth's analysis, proved to be native nickel. The menachine genus has received two additional species in the brown and the yellow menachan, inserted after iserine.

Having given this general idea of Werner's system, we cannot proceed to that of Haüy, without making honourable mention of the celebrated Romé de l'Isle, whose indefatigable researches so eminently contributed to the progress of the science of mineralogy in general, and whose "Crystallographie" (of which the first edition appeared in 1773) is deservedly characterized as the result of labours immense in their extent, almost entirely novel in their object, and of the highest importance on account of their utility. His classification of minerals has nothing peculiar; but for the accuracy, completeness, and elegance of his descriptions, and particularly his scientific method of determining the crystal-line forms, he stood unrivalled among the mineralogists of

his time. For an account of the labours of this father of crystallography, the reader is referred to the article **CRYSTALS**.

Several memoirs of Haüy, illustrative of his theory of the structure of crystals, were followed, in 1801, by that celebrated professor's great work, entitled "Traité de Minéralogie." In this important and truly classical production, the new theory (of which a detailed view is given under the article **CRYSTALLOGRAPHY**) is also made subservient to the classification of mineral substances. Haüy has defined the mineralogical species "an assemblage of bodies, the integrant molecules of which are similar to each other, and have the same composition." According to his mode of viewing the subject, minerals have both a geometrical and a chemical limit; the former consists in the invariable form of the molecule; the other in the composition of the same molecule. Haüy prefers making use of the geometrical limit for determining the species, not only because minerals being in general more or less mixed with heterogeneous matter, it often happens that the chemical limit is but imperfectly represented by the results of the analysis, whereas mechanical division invariably furnishes the same form of the molecule; but principally because the geometrical limit is far more obvious and palpable, since to obtain it nothing is in many cases required but the mechanical division of the crystal. In cases where the integrant molecule belongs exclusively to a determined combination of component principles, it alone is sufficient to distinguish the species; but there are forms of molecules which are common to several distinct species; and these forms, as far as they are known, happen to possess the peculiar character of symmetry and regularity, constituting, as it were, limits with respect to other forms. As in this latter case the character derived from the integrant molecule is not sufficient, Haüy adds to it another, chemical or physical, character for the discrimination of the species: thus, for instance, the property of dissolving in water, super-added to the cubic form determines muriate of soda, or common salt; but if the same form is united to the property of becoming electric by heat, we have borate of magnesia, or boracite. The type of the species, according to Haüy, being once determined, it is comparatively easy to arrange the varieties of crystallization belonging to the same substance, by ascertaining, with the assistance of the theory of decrements, whether all their forms, even those which no longer retain a trace of the primitive form, are in exact correspondence with the latter. With regard to the varieties, such as those composed of fibrous, granular, or compact masses, of which the type, though it still exists in them, can no longer be determined, their discrimination depends on the physical and chemical properties of the substance, such as hardness, specific gravity, electricity, &c. What regards the genera and upper divisions, the distribution is made after the component parts or chemical properties common to all the substances contained in the same division. The method adopted by Haüy, in his description of the mineral species, is the following. At the head of the description of each mineral is placed the essential character, founded on the most constant properties which distinguish its individuals; after which follow the physical, the geometrical (comprehending the cleavages and primitive form of the substance), and the chemical character; to which is added the distinctive character, in which the differences are pointed out which distinguish the substance in question from others which might be easily mistaken for it. These general characters are followed by the enumeration of the varieties of form (divided into determinable and undeterminable), the varieties depending on light, such as colour, transparency, &c.

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The following outline of Haüy's distribution is principally taken from his "Tableau comparatif des Résultats de la Crystallographie, et de l'Analyse chimique," Paris, 1809. The names included in parentheses are those of the Wernerian school.

Class I. Acidiferous Substances. Order I. Disengaged acidiferous substances. 1. Sulphuric acid. 2. Boracic acid. *Order II.* Earthy acidiferous substances. A With simple base:—*First Genus*: Chaux (lime), sp. 1. 3. Chaux carbonatée, (comprising all the Wernerian species of carbonates of lime, with the exception of the following species). 4. Aragonite. 5. Chaux phosphatée (apatite). 6. Ch. fluatée (fluor). 7. Ch. sulfatée (gypsum and selenite). 8. Ch. anhydro-sulfatée (anhydrite). 9. Ch. nitratée. 10. Ch. arseniatée (arsenic bloom; pharmacolite, Klapr.)—*Second Genus*: Baryte. 11. Baryte sulfatée (barytes or heavy spar). 12. Baryte carbonatée (witherite).—*Third Genus*: Strontian. 13. S. sulfatée (celestine). 14. S. carbonatée (strontian).—*Fourth Genus*: Magnésie. 15. M. sulfatée (natural Epsom or bitter salt). 16. M. boratée (boracite). 17. M. carbonatée (native magnesia or talc earth).—*Fifth Genus*: Lime and silica. 18. Chaux boratée filiceuse (datholite).—*Sixth Genus*: Silica and alumine. 19. Silice fluatée aluminéuse (topaz and pycnite, or stonr beryl).

Order III. Acidiferous alkaline substances.—*First Genus*: Potasse. 20. P. nitratée (natural nitre).—*Second Genus*: Soude. 21. S. sulfatée (natural Glauber salt). 22. S. muriatée (rock-salt). 23. S. boratée (tinkal, K.). 24. S. carbonatée (natural soda or natron).—*Third Genus*: Ammoniaque. 25. A. sulfatée (mascagnin, K.). 26. A. muriatée (natural sal ammoniac).

Order IV. Acidiferous alkaline-earthly substances. 27. Alumine sulfatée alcaline (alum)—*Appendix*. 28. Alumine fluatée alcaline (kryolite). 29. Glauberite.

Class II. Earthy substances. (No subdivision into orders) 30. Quarz (the whole of Werner's quarz family comprising fourteen of his species). 31. Zircon (zircon and hyacinth). 32. Corindon (corundum, sapphires, diamond-spar, emery). 33. Cymophane (chrysoberyl). 34. Spinelle (spinel, ceylanit). 35. Émeraude (emerald, beryl). 36. Émelase. 37. Grenat (garnet, melanite). 38. Amphigène (leucite). 39. Idocrase (Vesuvian). 40. Meïowite. 41. Feld-spath (feldspar). 42. Apophyllite (fish-eye stone, or ichtyophthalmite). 43. Triphane (spodumen). 44. Axinite. 45. Tourmaline (stonr). 46. Amphibole (all the sub-species of hornblende, except Labrador hornbl., actinote, augite and tremolite partly). 47. Pyroxène (augite, fahlite). 48. Yenite. 49. Staurotide (staurolite). 50. Épidote (pistazite, zoisit). 51. Hypersthène (Labrador hornblende). 52. Wernerite (arktazit). 53. Paranthine (scapolite). 54. Diallage (var. of actinote, schillerstein). 55. Gadolinite. 56. Lazulite (azur-stone). 57. Mefotype (fibrous and mealy zeolite, made stein). 58. Stilbite (radiated and foliated zeolite). 59. Laumonite (lomonit). 60. Prehnite. 61. Chabasie (schabasit). 62. Analcime (kubizit). 63. Nepheline (nephelin; sommit, K.). 64. Harmotome (cross-stone). 65. Peridot (chrysolite, olivine). 66. Mica (glimmer or mica). 67. Pinite. 68. Dithène (cyanite). 69. Dipyre (schmelz-stein; dipyr, K.) 70. Asbeste. 71. Talc. 72. Marle (hollow spar; chialsteite, K.)

To this class are appended the following substances, the characters of which are not sufficiently well understood to assign them their respective places in the system.

Allochroite (splintery garnet, K.) Alumine pure (pure clay). Amianthoïde. Antophyllit, Schum. and Wern. Aplome. Bergmannit, Schum. Diaspore. Feldspathopyre, H. (andalusit). Feld-spath bleu (var. of compact feldspar).

Fibrolite, Bourn. Gabbronite, Schum. Jade (common nephrite, axe-stone). Jolithe, W. and K. Kancel or cinnamon stone, W. Lazulit, W. Latialite (Haüyne). Lepidolite, W. Mellite, Fleuriau. Natrolite, W. Pseudo-sommit, Fleur de B. Spath en tables (schaalltein). Spinellane. Spinelle zincifère? (automalite). Spinhère, H. Talc? granuleux (earthy talc), and T. glaphique (bildstein; agalmatolite, Kl.)

Class III. Combustible not metallic substances.—*Ord. I.* Simple. 73. Soufre (sulphur). 74. Diamant (diamond). 75. Anthracite (kohlenblende, glanz-kohle).—*Ord. II.* Compounds. 76. Graphite. 77. Bitume (mineral oil; mineral pitch). 78. Houille (black coal). 79. Jayet (pitch coal). 80. Succin (amber). 81. Mellite (honey-stone).

Class IV. Metallic substances.—*Ord. I.* Not immediately oxidable, except by a very high degree of heat, and immediately reducible.—*First Genus*: Platina. 82. P. natif ferrifère (native platina).—*Second Genus*: Or. 83. O. natif. (native gold).—*Third Genus*: Argent. 84. A. natif (native silver). 85. A. antimonial (antimonial silver); as appendix to it, A. antimonial ferro-arsénifère (arsenical silver). 86. A. fulfuré (vitreous silver-ore). 87. A. antimonié sulfuré (red-silver-ore); and as appendix to it, A. antimonié sulfuré noir (brittle vitreous silver). 88. A. carbonaté. 89. A. muriaté (horn-ore or horn-silver).—*Ord. II.* Immediately oxidable and reducible: Mercure. 90. M. natif (native mercury). 91. M. argental (native amalgam). 92. M. fulfuré (cinnabar); and as appendix, Mercure sulfuré bituminifère (mercurial liver-ore). 93. Mercure muriaté (mercurial horn-ore).—*Ord. III.* Oxidable, but not immediately reducible: a, sensibly ductile.—*First Genus*: Plomb. 94. P. natif volcanique. 95. P. sulfuré (galena) by way of appendix, P. sulf. antimonifère, and P. sulf. antimonifère et argentifère (weissgultig-erz). 96. P. oxydé rouge. 97. P. arseniaté (flokken-erz, K.). 98. P. chromaté (red lead-ore). 99. P. carbonaté (white lead-ore); and, as appendix, P. carb. noir (black lead-ore, lead earth), and P. carb. cuprifère. 100. P. phosphaté (brown and green lead-ore). 101. P. molybdaté (yellow lead-ore). 102. P. sulfaté (natural lead vitriol).—*Second Genus*: Nickel. 103. N. natif (capillary iron pyrites). 104. N. arsenical (copper nickel). 105. N. oxydé (nickel ochre).—*Third Genus*: Cuivre. 106. C. natif (native copper) 107. C. pyriteux (copper pyrites); and, as appendix, C. pyr. hépatique (variegated copper ore). 108. C. gris (grey copper ore). 109. C. sulfuré (vitreous copper ore). 110. C. oxydulé (red copper ore and tile ore). 111. C. muriaté (faltz-kupfer). 112. C. carbonaté bleu (copper azur). 113. C. carb. vert (malachite; copper green). 114. C. arseniaté (lenticular copper ore; olive ore); as appendix, C. arsen. ferrifère (cupreous arseniate of iron, Bourn.) 115. C. dioptase (copper emerald). 116. C. phosphaté. 117. C. sulfaté (copper vitriol, K.).—*Fourth Genus*: Fer. 118. Fer natif (native iron). 119. F. oxydulé (magnetic iron-stone); and, by way of appendix, F. oxydulé granu-liforme (iron-sand). 120. F. oligiste (specular iron, iron mica, red iron froth, red hematite; compact red iron-stone, columnar clay iron-stone). 121. F. arsenical (common arsenical pyrites); and, as appendix, F. arsenical argentifère (weiss-erz, W. noble arsenical pyrites, K.) 122. F. sulfuré (common pyrites); and, as appendix, F. sulfuré épigène (leberkies, but not of Werner), and F. sulfuré ferrifère (magnetic pyrites). 123. F. oxydé (brown hematite; reniform and lenticular clay iron-stone; green iron-earth); and, as appendix, F. oxydé résinite (eisenpech-erz, or pitchy iron-ore); also part of F. oxydé carbonaté (sparry iron-stone). 124. F. phosphaté (blue iron earth). 125. F. chromaté (eisen-chrom, K.) 126. F. arseniaté (cube ore). 127. F. sulfaté

sulfaté (native vitriol).—*Fifth Genus*: Etain. 128. E. oxydé (tin-stone); and, as appendix, E. oxydé concrétionné (Cornish tin ore, or wood-tin). 129. E. sulfuré (tin pyrites).—*Sixth Genus*: Zinc. 130. Z. oxydé (calamine). 131. Z. carbonaté. 132. Z. sulfuré (blende). 133. Z. sulfuré (zinc vitriol, K.)—*b*, not ductile.—*Seventh Genus*: Bismuth. 134. B natif (native bismuth). 135. B sulfuré (bismuth glance); and, as appendix, B. sulf. plumbo-cuprifère (needle ore). 135. B. oxydé (bismuth ochre).—*Eighth Genus*: Cobalt. 137. C. arsenical (white and grey cobalt-ore). 138. C gris (cobalt glance). 139. C. oxydé noir (black cobalt ochre). 140. C. arseniaté (red cobalt ochre).—*Ninth Genus*: Arsenic. 141. A. natif (native arsenic). 142. A. oxydé (arsenic bloom). 143. A. sulfuré (yellow and red orpiment).—*Tenth Genus*: Manganèse. 144. M. oxydé (grey and black manganese ore); and, as appendix, M. oxydé carbonaté (red manganese ore). 145. M. sulfuré (manganese glance, K.) 146. M. phosphaté ferrifère (phosphor. mangan, K.)—*Eleventh Genus*: Antimony. 147. A. natif. (native antimony). 148. A. sulfuré (grey antimony ore). 149. A. oxydé (white antimony ore; antimony ochre). 150. A. oxyde sulfuré (red antimony ore).—*Twelfth Genus*: Uran. 151. U. oxydulé (pitch ore). 152. U. oxydé (uran mica; uran ochre).—*Thirteenth Genus*: Molybdène. 153. M. sulfuré (molybdène).—*Fourteenth Genus*: Titane. 154. T oxydé (rutile; menakan). 155. T. anatase (octaedrit). 156. T. siliceo-calcaire (sphen).—*Fifteenth Genus*: Scheelien. 157. S. ferrugine (wolfram). 158. S. calcaire (tungsten).—*Sixteenth Genus*: Tellure. 159. T. natif; auro-ferrifère (native sylvan), argentifère (graphic ore); auro-plombifère (nagyag ore).—*Seventeenth Genus*: Tantale. 160. T. oxydé ferro-manganésifère (tantalit, K.) and yttrifère (yttro-tantalit, K.).—*Eighteenth Genus*: Cerium. 161. C. oxydé silicifère (cererit, K.)

Two appendices contain, the one, all the compound rocks; the other, the volcanic productions. As neither of these classes of minerals form a prominent or distinctive feature in the system, it is only necessary in this place to mention the subdivision of those assemblages. The rocks are divided into aggregates of primary, secondary, and tertiary formation, and into those composed of fragments or detritus cemented together subsequent to the formation of the substances to which they belonged. The volcanic productions are divided into six classes: 1. Lavas, (subdivided into lithoid, glassy, and scorified). 2. Thermautides, or substances presenting only slight traces of volcanization. 3. Products of sublimation, such as sulphur, &c. 4. Altered lavas. 5. Volcanic tuftas. 6. Substances formed in the interior of lavas, such as mesotype, &c. Conf. Anon. über das Studium der Mineralogie. Häuy's Tabl. comparatif. Lucas' Tabl. des Espèces minerales.

MINERVA, LA, in *Geography*, a town of Naples, in the province of Otranto; 20 miles E.S.E. of Matera.

MINERVA, in *Mythology*, derived according to some à *minis*, from the threats of her stern countenance, otherwise called *Pallas*, is the goddess of wisdom and the arts; and the only one of the offspring of Jupiter to whom pertain the prerogatives of the supreme rank of divinity. Minerva is represented, both by the painters and poets of antiquity, as a beauty of the severer kind: the distinguishing character of her face is dignity and a certain sternness, which has more of masculine than feminine in it: and, therefore, more apt to strike one with awe and terror, than to charm one, at first sight. Her dress and attributes are adapted to the characters of her face; she most usually appeared with a helmet on her head, and a plume that nodded formidably in the air; in her right hand she shook her spear, and in her other grasped

her shield, with the head of the dying Medusa upon it; the same figure appears also on her breast plate called *Egis*, which was the skin of a goat, or, as others say, of a monster so called, which vomited fire and committed dreadful havoc in Phrygia, Phœnicia, Egypt and Libya, and which was killed by Minerva, and hence she wore its skin upon her buckler; and sometimes the goddess herself is represented as having living serpents about her breasts, and about her shoulders; she is also accompanied with a cock, which is a fighting bird, and corresponding to her character as the inventress and president of war, and an owl, which sees in the dark, and, therefore, is the image of wisdom. It is probable that the Romans considered Jupiter, Juno, and Minerva, as one and the same divinity, under three different names: among which names, that of Jupiter might signify supreme goodness; that of Minerva, supreme wisdom; and that of Juno, supreme power: thus the learned Dr. Cudworth observes, *Intell. Syst. b. 1. c. 4. p. 450*, that the three Capitoline gods, Jupiter, Juno, and Minerva, may be understood to have been nothing else but several names and notions of one supreme deity, according to its several attributes and manifestations. Cicero mentions five goddesses of the name of Minerva, and Clemens Alexandrinus admits also the same number. Several cities were distinguished by the worship which they paid to Minerva; among others Rhodes and Athens, but Sais in this respect rivalled all the cities in the world, for here this goddess had a magnificent temple, which Herodotus has particularly described. The same author also speaks of temples consecrated to this goddess in several cities of Greece; but the island Dio, or Naxos, though consecrated to Bacchus, was more remarkable for the worship of Minerva, which appears by her representation on three medals of that city. At Athens she had a magnificent temple, called "Parthenos," the virgin, which Phidias adorned with a statue of gold and ivory, reckoned his master-piece. The worship of Minerva was rendered still more solemn by a festival, called "Atheneia," celebrated to her honour, and the pomp of which invited spectators from all Greece. This festival afterwards took the name of "Panathœnaia," in which was a procession, when the people carried about the "peplus" of Minerva, which was a white robe without sleeves, wrought with gold, on which were represented the combats and great achievements of Minerva, Jupiter, and the Hermes.

Minerva is also ranked among the musical deities, to whom the invention of the flute is ascribed. See *FLUTE*.

MINERVALIA, among the Romans, called also *Quinquatria*, were feasts celebrated in honour of Minerva. One of these feasts commenced on the 3d of January, and another on March 19th, and lasted five days. The first day was spent in prayers to the goddess; the rest in offering sacrifice, seeing gladiators fight, acting tragedies upon mount Albanus, and reciting pieces of wit, wherein the conqueror had a prize given him. Scholars had then a vacation, and made a present to their masters, which was called *Minerval*.

MINEUR, Fr., MINOR, Lat., a musical term applied to such concords and intervals, as are rendered as flat or small as possible, without being false and out of tune. Mineur is said also of a key or mode in which the third above the key note is minor or flat. See *MODE*, *MAJOR*, and *INTERVAL*.

MINGALLA, in *Geography*, one of the small western islands of Scotland, the largest of those called "Bishop's islands," about three miles long and one broad. N. lat. 56° 48'. W. long. 7° 35'.

MINGAN ISLANDS, a cluster of islands near the south

coast of Labrador, in the gulf of St. Laurence, so called from the name of the principal of them. N. lat. 50° 15'. W. long. 64°.

MINGHIOL, signifying "Thousand Springs," a mountain in the northern part of Armenia, abounding with springs; from which the Euphrates originates.

MINGO, an Indian town on the W. bank of the Ohio river, 40 miles south-westerly of Pittsburg. In the creek, where it is situated, there are springs, that yield the "petrol," a bituminous liquid.

MINGOES, an Indian nation, inhabiting the vicinity of the southern branch of the Scioto river. The number of warriors is 40.

MINGOLZHEIM, a town of the duchy of Baden; 14 miles S.E. of Spire.

MINGOTTI, REGINA, in *Biography*, a female opera singer and actress of great abilities and celebrity, was born in Carinthia, a German province, in the dominions of Austria, and though a native of a transalpine country, she became one of the most eminent vocal performers on the Italian opera stage during the last century. After seeing and hearing her frequently in England, where she arrived in the year 1754, we met with her, in 1772, at Munich, in Bavaria, and in conversation obtained from her the following sketch of her active professional life.

Her parents were Germans; her father, an officer in the Austrian service, being called to Naples upon duty, his wife travelled with him thither during her pregnancy, and was there brought to bed of this daughter; who, however, was carried to Gratz, in Silesia, before she was a year old; and her father dying while she was young, her uncle placed her in a convent of Ursulines, where she was educated, and where she received her first lessons of music.

She told us, that during her childhood, she remembers being so pleased with the music performed in the chapel of her convent, particularly with the Litany sung there one festival, that she went to the abbess, with tears in her eyes, and trembling, both with fear of anger, and of a refusal, to intreat her to teach her to sing, as *she* did in the chapel. The abbess put her off, with saying, that she was very busy that day, but would think of it. The next day she sent one of the elder nuns to ask her who bid her make that request, when the little Regina, as she was then called, replied, that nobody had bid her, but that it was merely her own love for music which inspired the thought. After this the abbess sent for her, and told her, that she had very little time to spare; but if she would promise to be diligent, she would teach her herself; adding, that she could only afford her half an hour a day; but with that, she should soon find what her genius and industry were likely to produce, and she should go on with, or discontinue her instructions accordingly.

Regina was in rapture with this compliance of the abbess, who began to instruct her the next day, *à table sec*, as she expressed it, without a harpsichord, or any other instrument. She applied to the harpsichord several years after, and still accompanied on it very well. But it was perhaps owing to her manner of learning to sing *without* an instrument, that she acquired the firmness in performance, for which she has always been remarkable.

In this manner she was taught the elements of music and *solfeggi*, with the principles of harmony, and was obliged to sing the treble, while the abbess sang the base. She shewed us a very small book, in which all her first lessons were written: the explanations were in the German language.

She remained in this convent till she had attained her

14th year, at which time, upon the death of her uncle, she went home to her mother. During the life of her uncle, she had been intended for the veil. When she quitted the convent, she appeared, in the eyes of her mother and sisters, to be one of the most useless and helpless of beings; they looked upon her as a fine lady, brought up in a boarding school, without knowing any thing of household concerns; and her mother neither knew what to do with her, or her fine voice, which both she and her sisters despised, not foreseeing that it would one day be productive of so much honour and profit to the possessor.

Not many years after she quitted the convent, signor Mingotti, an old Venetian, and manager of the opera at Dresden, was proposed as a husband for her. She detested him, but was at length worried into a compliance, which was the sooner extorted from her, perhaps, as she, like other young women, imagined that by losing, she should gain her liberty.

People talked very much of her fine voice and manner of singing. Porpora was at this time in the late king of Poland's service, at Dresden: he had heard her sing, and spoke of her at court as a young person of great expectations; which occasioned a proposal to her husband for her entering into the service of the elector: he had before marriage promised never to suffer her to sing on the stage; however, he came home one day, and asked her, if she should like to engage in the service of the court. She thought this was done in derision, and gave him a short and peevish answer; but he continuing to teize her on the subject, at length convinced her that he was in earnest, and had a commission to treat with her. She liked the thoughts of singing, and turning her voice to some account, and therefore gladly entered into articles for a small stipend, not above 3 or 400 crowns a-year.

When her voice had been heard at court, it was supposed to raise a jealousy in Faustina, who was then in that service, but upon the point of retiring; and consequently, in Hassé, her husband, particularly when he heard that Porpora, his old and constant rival, was to have 100 crowns a month for teaching her. He said it was Porpora's last stroke; the only twig he had to catch at; *un clou pour s'accrocher*. However, her talents made such a noise at Dresden, that the fame of them reached Naples, to which place she was invited to sing at the great theatre. In her way thither from Dresden she passed through Vienna, where she visited unexpectedly Metastasio, in whose "Attilio Regolo" she had distinguished herself; of which visit he gives the following account to the princess di Belmonte.

"Signora Regina Mingotti, one of the principal ornaments of the vocal band at Dresden, being engaged at Naples in the same rank, has not escaped the epidemic desire of bringing with her a letter from me to your excellence. This request, however, would have been fruitless, had she not most wickedly and maliciously hit upon the following expedient, for vanquishing my well-known repugnance to give way to such applications. When she left the court of Dresden, what does she do but post away to Vienna; and without giving me the least previous notice of my danger, early one fine morning presents herself in my room, and in a military habit, preceded only by her fame, and accompanied by all the graces of youth, vivacity, talents, and what is still worse, entitled to the chief credit of the successes of my "Attilio" in Dresden. Now tell me madam, with your usual candour, if ever you heard of so cunning a musical trick, it was like putting a knife to the throat of a poor Christian. I know not what Socrates, Cato, or Aristotle would have done in such a case; but this I know, that

that I could not help writing the letter, and even devoutly thanking heaven, that she had the moderation to limit her pretensions to a letter only."

This letter has no date, but it must have been written in 1751, when "Attilio" was first represented at Naples.

At this time she knew but little Italian; however, she now went seriously to work in studying it.

The first character she appeared in was Ariftea in the opera of the "Olimpiade," set by Galuppi. Montecelli performed the part of Megacles. On this occasion her talents, as an actress, gained her as much applause as her singing: she was bold and enterprising; and, seeing the character in a different light from what others had done before her, would, in spite of the advice of old actors, who durst not deviate from custom, play it in a way quite different from any one of her predecessors. It was in this original and courageous manner, that our Garrick first surprised and charmed an English audience, and, in defiance of contracted rules, which had been established by ignorance, prejudice, and want of genius, struck out a style of speaking and acting, which the whole nation has ever since continued to approve, with acclamation, rather than applause.

After this success at Naples, Signora Mingotti received letters from all parts of Europe, to offer her terms for engaging at different operas; but she was not then at liberty to accept of any of them, being obliged to return to the court of Dresden, in which service she was still a pensioner; however, her salary was considerably augmented, and she frequently expressed her gratitude to that court, and said she owed to it all her fame and fortune. Here she repeated, with great applause, her part in the "Olimpiade;" every one agreed, that in point of voice, execution, and acting, her powers were very great; but many thought that she was wholly unfit for any thing pathetic or tender.

Haffe was now employed to set "Demofonte;" and she imagined that he kindly gave her an adagio, accompanied by the violins, Pizzicati, merely to expose and shew her defects. But suspecting the snare, she studied hard to escape it; and in the song, "Se tutti i Mali Miei," which she afterwards sung in England with great applause, she succeeded so well, as to silence even Faustina herself. Sir Ch. H. Williams was English minister here at this time, and being intimate with Haffe and his wife, had joined their party, publicly declaring that Mingotti was utterly unable to sing a slow and pathetic song; but when he had heard her, he made a public recantation, asking her pardon for doubting of her abilities, and ever after remained her firm friend and adherent.

She went next to Spain, where she sung with Gizziello, in the operas under the direction of Fariuell; who, she said, was so rigid a disciplinarian, that he would not allow her to sing any where but in the opera at court, or even to practise in a room next the street. She was requested to sing at private concerts by many of the first nobility and grandees of Spain, but could not obtain permission from the director; who carried his prohibition so far, as to deny a pregnant lady, of great rank, the satisfaction of hearing her, though she was unable to go to the theatre, and declared that she longed for a song from Mingotti. The Spaniards have a religious respect for these involuntary and unruly affections in females thus circumstanced, however they may be treated as problematic by M. Buffon and others. The husband, therefore, of the lady, complained to the king of the cruelty of the opera director, who, he said, would kill both his wife and child, if his majesty did not interfere. The king lent a favourable ear to the complaint, and ordered Mingotti to receive the lady at her house, in which his majesty was implicitly obeyed, the

lady's desire was satisfied, and the child prevented, perhaps, from being marked in some part of its body with a music paper, or from having an Italian song written with indecipherable characters on its face.

Mingotti remained two years in Spain, whence she came to England, for the first time, in 1754. How much her performance was then admired many persons now living can well remember, and tradition has told the rest. She afterwards sung in every great city of Italy: but always regarded Dresden as her home during the life of Augustus, the late king of Poland. She was now settled at Munich, more it was thought from economy than attachment. She had no pension from the court of Bavaria, as was reported; but with care and prudence, she had just sufficient from her savings to bring her safely through the year. She seemed to live very comfortably, to be well received at court, and to be esteemed by all such as were able to appreciate her understanding, and enjoy her conversation.

It gave us great pleasure to hear her speak concerning dramatic music, which she did with more intelligence than any maestro di cappella with whom we ever conversed. Her knowledge and experience in singing, and powers of expression in different styles, were still astonishing, and must have delighted all such as could receive pleasure from song unaccompanied with the blandishments of youth and beauty. She spoke three different languages, German, French, and Italian, so well, that it was difficult to say which was her own. English she likewise spoke, and Spanish, well enough to converse in them, and understood Latin; but in the three languages first mentioned she was truly eloquent.

Her style of singing was always grand, dramatic, and such as discovered her to be a perfect mistress of her art; she was a most judicious and complete actress, extending her intelligence to the poetry, decorations, and every part of the drama. Yet her greatest admirers allowed that her voice and manner would have been more irresistible, if nature had allowed her a little more female grace and softness. Her performance of male parts, however, obviated every objection that her greatest enemies could make to her perfection, either as a singer or actress.

The first time Mingotti came to England, she remained here three years; during part of which time she and Giardini were joint managers; by which their celebrity was more increased by their talents, than their fortune by the profits of the theatre.

MINGRAY, in *Geography*, a town of Spain, in Catalonia, near the mouth of the Tet; 15 miles E. of Gerona.

MINGRELIA, a country of Asia, the ancient *Colchis*, (which see), is bounded on the N. by Circassia, on the E. and S.E. by Imeritia, on the S. by Guriel, and on the W. by the Black sea and Abascia. This country is woody, intermixed with a small proportion of arable land, which is so soft as scarcely to bear the plough. The climate as well as the soil is relaxed by moisture; and it is said that in many places the ground sounds hollow, from which circumstance originates an opinion, that the Euxine and Caspian are connected by a subterraneous communication. Mingrelia is watered by the Phasis, and a great number of other rivers. The chief food of the inhabitants is "gom," a grain resembling millet; wheaten bread is used only by the prince and nobility. This country was originally rich in gold, and hence, it has been said, the Argonauts fetched the golden fleece; but the mines of precious metals are now unwrought. Ancient Colchis, of which Mingrelia is a part, contained a great number of cities and towns, most of which have long since sunk into oblivion. The present capital of this part of Turkey in Asia, called Cotatis or Cutais,

Cutais, comprehends hardly 200 houses, though it is the residence of the prince. The air is rendered infalubrious by frequent rains, and the inhabitants seldom protract their lives beyond 60 years. The vines of the country produce excellent wine, and the pastures, which are excellent, feed many horses. The men, as well as women, are generally well formed and handsome; but they are reckoned, in general, to be thievish, perfidious, cruel, drunken, and licentious in their amours. Infants, that have no means of support, are often put to death, as well as sick persons, of whose recovery there is no reasonable expectation. The people are generally employed in the chase, and they think themselves peculiarly happy, if they possess a horse, a good dog, and a well-trained falcon. The peasants are slaves to the nobility; who have the power of life and death over their vassals in Mingrelia, as well as Imeritia, Guriel, and Georgia. Their religion is that of the Greek church: The principality is hereditary, and the prince or chief of Mingrelia and Guriel assumes the title of "Dadian," or the chief of justice; and the tribute exacted by the Turks is a quantity of linen cloth, manufactured in the country. The principal commerce is in slaves.

MINHO, Lat. MINIUS, which is said to derive its name from "Minium," or vermilion, found in its neighbourhood, is a river of Spain, that rises on the E. of the Sierra Mondonado, in the province of Galicia, receives the waters of the Cuytella and the Ouaría, passes to Lugo, receives the Chouro, and at San Martino de Coba the Sil, and then pursuing the boundary of Galicia, separates it from Portugal, whence it proceeds and falls into the ocean near the port of Guardia; its course is about 52 leagues, first from N. to S., then to the S.W.

MINIACI, or CASALINO, a town of Sicily, in the valley of Demona; 10 miles S.W. of Randazzo.

MINIATO, ST., a town of Etruria, on the Arno, the see of a bishop, containing four churches besides the cathedral and nine convents; 20 miles W. of Florence. N. lat. 43° 44'. E. long. 10° 40'.

MINIATURE, in *Painting*, a word borrowed of the French, and derived, as some say, from the Latin *minimum*. It properly signifies the representation of natural objects, by figures drawn and painted in small proportions; but there is something arbitrary in its present use, as it is almost entirely confined to portraits painted with water-colours on paper, vellum, or ivory; and is not applied to small figures painted in oil, on wood, stone, or canvas. Thus, Gerard Dow's and Adam Elsheimer's very finely executed works, wherein sometimes are figures not more than two or three inches high, and consequently far smaller than miniature portraits are usually painted, which ought therefore, according to the preceding etymology of the word, to be called miniatures, never are so, but are constantly spoken of as small pictures. But we conceive that the term miniature is derived, agreeably to the statement of other writers, from *minium*, vermilion, whence the persons who put the red letters, and illuminations in ancient manuscripts, were called *miniatores*.

In this branch of the art of painting, the same feeling of character, the same taste and understanding of drawing and chiaro-scuro are requisite, as in oil painting; but the use of its materials is more facile, and less likely to produce, in unskilful hands, such discordant and unpleasant effects, though the process is more tedious. It requires great ingenuity and patience in the artist, as it is wholly performed with the point of the pencil, either applied in the manner termed hatching, which consists of fine strokes crossing or intermingling with each other; or that of stippling, or laying dots of various colours over the surface of the picture. One

of these modes of proceeding is necessary to produce softness, with fullness and richness in miniature; because ivory and vellum, from the peculiarity of their textures and surfaces, do not admit of the system called washing, or blending the colours together in a broad soft manner, like aqua-tint; and in works like these, whose beauties are not discernible but on a near inspection, great neatness and perfection in the finishing are imperiously demanded.

The miniatures which are of the oldest date in England were chiefly wrought on vellum, though the cabinets of our nobility and gentry contain some few in oil colours on thin copper-plates: and this latter system might well have been adopted generally, but for the difficulty of producing the essential beauties of miniature, *viz.* clearness and purity, with so gross a vehicle as oil is, when compared with water; and also, that there is much danger, if the picture be worn, of some of the colours changing, and becoming dark: otherwise, and if merely hung up for ornament, a decided preference must be given them for their durability over those painted in water colours.

The adoption of ivory for miniature painting, in preference to vellum, which, although limited in size, is now almost universal, is founded on three circumstances, *viz.* its being so much less likely to be affected by damp, capable of receiving a smoother texture, and having a more agreeable hue of colour, which greatly blends with the fresher hue of the flesh, and gives it warmth and harmony. It also possesses a degree of absorption, which renders the colours less likely to fade. So great is the effect of damp upon vellum, or of the substances employed to smooth and prepare its surface for the artist, that there are few miniatures painted upon it, of recent date, even the colours of which are not in some measure impaired; and in many they are almost totally destroyed.

The colours best adapted for miniature painting are those that have the least body, and that work clear and clean in hue; such as lakes, carmine, ultramarine, browns, yellows, and greens made of the juices of certain herbs and flowers. Most of the earthy colours, as the ochres, by no means are easily applied to this purpose: their opacity and body render them unfit agents, where all should be light, splendid, and clear. The vehicle which best suits the purpose is water, in which either gum Arabic or gum tragacanth is dissolved. The colours should be first ground in pure water, and the gum-water added afterwards, in sufficient quantity to give them tenacity, that they may not easily rub off the surface of the ivory or vellum; but if too much gum be used, there is great danger of the colours cracking and falling off.

In the process of miniature painting, our modern artists cover the ivory with colours more than was usually done by those of an early period, who were accustomed to leave the naked ground or colour of that substance in a large proportion in the fleshy parts, and contented themselves with little more than drawing very delicately the features of their sitters on it, and rounding the extremities with shadows. Though much more rotundity and richness of effect is gained by the present process, when skilfully employed; yet in hands less ingenious, there is great danger of heaviness, and loss of character and simplicity, those prime and inimitable qualities in all works of art, the want of which cannot be compensated for by all the colour and delicacy of finish the utmost stretch of art, without them, is capable of producing. But, in fact, the capabilities of water colours are become far more known and understood of late, as well as the best modes of applying them. A new school in that branch of art has arisen in the course of the last ten or fifteen years; since when, effects have been produced by them, which leave all former experience of their power far behind, and of

which nothing could have been expected. Of this more under the article *Water-Colours*.

The most successful artists in miniature in this country, till the present period, were Nicholas Hilliard and Isaac Oliver, in the time of Elizabeth; and P. Oliver and S. Cooper, in that of Charles I. The works of the latter are particularly striking, and worthy of observation, for the extraordinary breadth of manner, which he appears to have caught of Vandyke; many of whose pictures he copied in miniature, and which his own pictures resemble so much, that a magnifying glass only exhibits to greater effect the simplicity of the style in which they are wrought.

We now possess a great number of very ingenious artists in this branch of the profession: but to particularize any one, when so many stand on nearly the same level, would be invidious; and the public have ample opportunities of deciding on their respective merits.

For the method of preparing ivory for miniatures, see *Ivory*.

MINICULATOR, among the Romans, a servant who embellished any writing with minium.

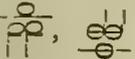
MINIET, or **MINIEN**, in *Geography*, a small but somewhat handsome town, compared with other places in the same country, in Upper Egypt, on the west banks of the Nile. Its streets, however, are narrow and dusty: the houses are built of unbaked bricks, cemented with mud; and many of its edifices are clumsy and irregular. The house occupied by the kiaschef or cashief, as well as those of some other persons, are built of stone, and their whiteness relieves the uniform reddish-grey of the rest. The bazars, or places where the merchants meet, are tolerably commodious; and the crowds which frequent them announce a numerous population, as well as some briskness of trade. Government has here established a toll for loaded vessels, which is easily collected, as the Nile is not wide at this place. Here are manufactured earthen vessels, called "bar-dacks," formed of clay in the neighbourhood, and serving to preserve the water cool. Columns of granite, broken and thrown down, and some still standing, besides heaps of rubbish, intimate that Miniet occupies the place of a more ancient city; which, according to some, was "Hermopolis," and, according to others, "Cynopolis," where the dog was worshipped. Mr. Bruce supposes Miniet to be the ancient "Phile." It is about 50 leagues from Cairo, 22 miles S. of Abu Girgê, and 14 N. of Ashmuneim, or Achmounim.

MINIET Rabiné, a town of Egypt; 6 miles S. of Gizeh.

MINIET Selamé, a town of Egypt; 10 miles S. of Faoué.

MINIET Semannud, a town of Egypt; 8 miles S. of Manfora.

MINIM, in *Music*, from *minimus*, Lat., the least. In the first time-table that was framed, where the semibreve was the shortest note, and the first in a round form, the rest were square. But as the art of counterpoint was improved, and different parts in notes of different value were attempted, it was found necessary to divide the semibreve in two equal

parts, ; diminishing the length of a semi-

breve one half, by adding a tail to it. This invention has frequently been ascribed to Vitriaco; but it seems more properly to belong to Franco, as appears by a manuscript tract in the Bodleian library at Oxford. Franco flourished 200 years before Vitriaco. See *MUSICA Mensurabilis*, **TIME**, **MEASURE**, and *Musical CHARACTERS*.

MINIM, *Sextuple of the*. See **SEXTUPLE**.

MINIMA NATUREÆ, or *Minima Naturalia*, among *Philosophers*, the primary particles of which bodies consist;

the same with what are otherwise called *corpufcles*, and *atoms*.

MINIMA, in the *Higher Geometry*, the smallest quantities attainable in any given case. See **MAXIMA**.

MINIMA, *Per*. See **PER MINIMA**.

MINIME, in old French *Music*, was the same character for time as is now called *une blanche*. See **MINIMI** and **TIME-TABLE**.

MINIMENTS, or **MUNIMENTS**. See **MUNIMENTS**.

MINIMI Digni Extensor. See **EXTENSOR**.

MINIMI Digni Pedis Abductor. See **ABDUCTOR**.

MINIMS, **MINIMI**, an order of religious, instituted about the year 1440, by S. Francis de Paulo, confirmed in 1473, by Sixtus IV., and by Julius II. in 1507. See **BONS-HOMMES**.

These have improved on the humility of the *Minors*, by terming themselves *Minimi* or *Minims*, *q. d.* least, or smallest.

MINIMUS GLUTEUS. See **GLUTEUS**.

MINING, *History of*. To trace this subject up to its earliest stages, and to exhibit the various combinations of human ingenuity which it has in successive periods produced, though an inquiry which might afford matter for curious speculation, would be one which, if we were to take into the view the progress of mining in all the different countries where metals have been found, would extend the subject to a length hardly admissible in any work not wholly devoted to this object.

From the simplest operations, mankind have been gradually led, by following the pursuit of the metals, to efforts the most complex and astonishing. At first it may be assumed, not only from the probability of the thing, but from evidence which even this country affords, in the remains of ancient works of this kind, that metals were procured from detached fragments of the ores, such as had been separated by various causes from the upper parts of the veins in which they were originally deposited: and in this manner is gold yet procured, by washing the sands of certain rivers; and tin even now sought after, under beds of gravel, in the vallies of Cornwall and Devon.

The pursuit of scattered pieces of ore naturally would conduct the persons, who were thus employed, to the beds from which they had been detached; and in turning over the soil to procure the loose fragments, the backs of the veins would be laid open and discovered. This is a process which is even now daily going on in mining districts, only with a different object: for having found an accidental stone of ore, the miner does not row dig over the earth on the surface, for the sake of these casual deposits; but reasoning from their appearance that a vein is near at hand, goes at once to work in order to find it.

If we allow that this account of the origin of mining be true, it ought to follow that those metals were most anciently worked, whose ores are most attractive in their appearance, most easily reduced into a metallic state, or such as are most usually found near the surface of the earth. As far as the English mines afford us the means of judging, all this may be asserted to be true. The tin of Cornwall was undoubtedly the first metal sought after in Britain, and probably the first article of commerce with other nations; and the ores of tin, from their great weight, indicate their metallic contents, and yield them to the simplest treatment with fire, and are still found at inconsiderable depths. It may also be observed, that the traces of the most ancient tin works exhibit no symptoms of their having been pursued, but in situations where the soil, with which it was mixed, could be easily and expeditiously removed; or where it

could

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could be washed away by streams of water, conducted over it for the purpose, and which, by carrying off the lighter parts of the soil, laid bare the ores, which are kept from moving by their superior specific gravity.

This latter was an ingenious improvement upon the first ruder efforts, and is still the mode employed in many of the tin stream works; while there are numerous traces of these attempts accompanied with circumstances, which prove them of very considerable antiquity.

Lead is another metal, which not only is often found near the surface, but the ores exhibit to the eye the appearance of metal, and in general yield their contents to the heat of a moderate fire. This metal, therefore, was probably an object of pursuit in the early ages of mining.

Copper, on the other hand, is seldom found without penetrating the earth to considerable depths; and the proportion of metal in most of the ores is so small, that a certain progress in the arts of mining and smelting must be presumed to have been made, before it could have become an object of research. We believe this to have been the fact in most countries, as well as in this, where copper was certainly discovered by working mines in pursuit of tin or lead.

From the processes for finding and separating metallic ores from alluvial matter in which they were casually mixed, the next step was to procure them by digging out the veins themselves, and following them into the solid rocks in which they are formed. At first this could only have been done, where, by the elevation of the mountains, it was possible to work high enough for the waters to discharge themselves by conduits or adits from the works; and where the rock was not so hard but to yield to tools rudely formed, or perhaps to the agency of fire, which would, however, produce but a limited effect in most cases.

It was not until machines were applied to pump the waters, that the metals could be followed to any considerable depth, and not until gunpowder had furnished the means of splitting the hardest rock, that man was enabled to penetrate strata of every description that opposed his progress.

These inventions, therefore, form most important epochs in the history of mining; for, since mankind have called in the assistance of such powerful agents, neither the influx of constantly flowing water, nor the barriers which the most indurated rock can present, are obstacles in the way of the miner, where rich and productive veins of ore tempt the pursuit.

The first important era was the period in which the application of gunpowder to the purposes of mining took place, which happened in Hungary, or Germany, about the year 1620, and was first introduced into England at the coppermine at Ecton, in Staffordshire, about the year 1670, by some German miners brought over by prince Rupert. It was in use in Somersetshire about 1684, and it was not until after this period, probably, that the Cornish miners became acquainted with this powerful assistant to their operations.

Its importance may be judged of by the amount of the present consumption in the mines of Cornwall alone, which has been calculated at an annual value of about forty thousand pounds sterling.

There are many mines which could not possibly have been worked without the aid of gunpowder, and, until it was used, subterranean operations must have been difficult and very uncertain. The hammer and wedges were probably the first instruments employed for splitting rocks, and the pick followed, which is used both as a hammer and a wedge. The change of form in these instruments observed in those which have been found in old works, as well as the materials of

which they are sometimes made, offer evidence of considerable antiquity.

Many tools of oak have been occasionally met with, which tradition among the Cornish tanners make to have belonged to the Saxons or Danes, but it is probable that they were employed before the time of their having a footing in the country, and most likely when iron was little known here.

Wedges of dry wood were made use of by driving them into clefts of the rock, and then wetting them, so as to cause them to swell, and thus by repeated similar insertions to force the ground asunder.

Agricola describes the application of fire to the splitting of rocks, but there is no tradition of its having been applied to this purpose in England.

The means employed for raising or throwing up the ores and waste stuff to the surface, were at first as rude as the other operations of mining. The *windlafs and bucket* may be reckoned an improvement which took place in a later stage of mining, as simple a one as it certainly is, and now in a great measure superseded by more effective machinery. It was, however, at the time an important addition to the apparatus of mines, as water as well as ore could thus be raised to moderate heights; and by the employment of much manual labour with a number of such machines, even considerable excavations were kept free from water, and had their produce lifted to the surface.

The windlafs, probably, like most of the early improvements in mining, had its origin in Germany, and before it was introduced here from that country, the mode adopted for throwing up the stuff dug in the bottom of the deeper pits, was by making successive steps, or stages, which were called in Cornwall *shammels*; upon each of which men were placed, who raised the excavated matter from one to the other, until it thus reached the highest point.

In South America the windlafs is even yet hardly known, and the ores are either carried up by the Indians employed in the mines, or, where the situation admits of sloping roads being made to the bottoms, are conveyed to the surface on the backs of mules.

When mines were worked deep, the labour of raising the water which was constantly collecting, became too great for mere manual exertion, and hydraulic machines were invented or employed for the purpose. Pumps were adapted to the shafts, and their constant action secured by giving motion to their pillars by wheels turned by descending streams of water. Where supplies of this agent can be obtained, and the force of the country admits of its application with considerable falls, nothing better can be desired, as it is a more regular power than steam, and infinitely less expensive; it has, therefore, continued in use to the present day, where circumstances admit of its being applied.

The German miners seem in all probability to have had the merit of these inventions, as they appear to have been completely in use among them when Agricola wrote, who fully describes their construction and application.

But though Germany may fairly claim the invention of these engines for this purpose, yet nothing more has been done there; but, on the contrary, they are said to remain now there in nearly the same state as at their original introduction. The English miner has improved the pump-work and the water-engines to their present high state of perfection in this country.

It is in some degree owing to necessity that this has been the case, as there are single mines in England which require that as much water be discharged from them, as the pumps of a whole province of German mines could effect. There

is, indeed, no need to prove the capacity of English artists for mechanical improvement.

Hydraulic machines, however, as they require falls of water to put them into motion, can only be erected where the circumstances of a country afford the means of working them; and if nothing farther had been done, many of our most valuable mines in Cornwall, not to mention our galleries and lead mines, would have remained unexplored and unproductive. The invention of the *steam-engine* gave to the miner a power capable of universal application, and of an effect that added, as it were, new regions of subterranean country to his control. Depths hitherto unattainable are now placed at his command, and no limit can be assigned to his exertion, but that of the expence compared with the value of the produce.

The history of the steam-engine will be a subject for another place; but we may here observe, that the invention very early excited the attention of the mine owners of Cornwall, who successively adopted and encouraged the improvements of Savary, Newcomen, and Watt.

In this district some of the earliest efforts of these ingenious men were seconded and rewarded, and in return the mines have gained such assistance as could not have been formerly anticipated or imagined.

The general history of mining in England has never been very accurately traced; the districts famous for their mineral products have no communication with each other on this account, and have no common mineral laws or customs.

In other countries mining has been fostered and protected by the state, immunities have been granted, the workmen have been surrounded by particular privileges, and their operations encouraged by grants of timber from royal forests, or the free use of lands and waters. Thus peculiar systems of laws have often arisen where the mines were important as a source of revenue to the state. Something of this sort is indeed to be traced in the stannary laws of Cornwall; these laws, however, are not operative in the other mining districts of England, but are confined to the counties of Devon and Cornwall, which are both included in the royal duchy which bears the name of the latter. Here the stannary laws still existing, now afford the miner but scanty assistance, though they effectually provide for the secure payment of the mineral revenue to the duke of Cornwall. To this object, and to the adjoining disputes touching the affairs of tin mines, the present administration of these laws may be said to be directed. The protection to the person of the tinner, as to military service and processes from other courts, has been gradually removed, and the rights of embounding lands for his pursuits, and of obtaining water-courses for his engines, have been questioned, and, in some cases, rendered doubtful. It cannot, perhaps, be contended that these laws could now be exercised in their former construction in the present state of property; but a revision, accommodating them to the fair wants of the miner, without prejudice to the land owner, would be attended with much benefit to the mining interest.

The copper-mines, being altogether of later date than those of tin, partake of none of the advantages which the stannary laws afford, and are therefore governed more by custom than any thing else; an extension of the privileges of the tin mines to these, and a legal provision for the peculiar arrangements which such undertakings require, would remove many serious obstacles to their prosecution.

Mining in England had a very early origin, compared with the progress of other arts in the country; it was in all probability the first source of trade to these islands, and the tin of Britain was known in distant parts of the world at a very remote period. It is generally believed that the Phœnicians were the nation principally engaged in trading to

Britain for the metal. Tin works were carried on before iron was in use in England, as may be presumed from the tools of oak which have been found in ancient mines. Ctesero affirmed that no silver was to be found in Britain, and though it has since been proved that he was wrong in that respect, yet the notice taken of the subject serves to shew that the metals of the country were the principal temptation to the Roman conquerors.

The Saxons neglected the pursuit of the metals, but the Normans appear to have worked for them to advantage, and from this time, until the reign of king John, the mines were mostly in the hands of Jews, when they are said not to have been successful, but in the reign ensuing they were worked by the same people with more effect. Edward I. caused the Jews to be banished, and the mines were, in consequence, neglected, until Edmund, the elder son of that king, and earl of Cornwall, willing to restore what had produced so large a proportion of the revenues of his domain, made grants important to the miner, which were confirmed by the king, by a charter in the 33d year of his reign; which states that

“For the advancement of the stannaries, he frees the tanners from all pleas of the natives touching the court, and from answering before any justices, &c. save only the keeper of the stannaries; (pleas of land, life, and member excepted) neither are they to be kept from work but by the said keeper.” And it further “indemnifies them from tolls, &c., gives them libertie to dig tin and turf any where in the said countie, and to turn water-courses for their works at pleasure; with many other privileges.”

It is from this time that the enactment of laws for the government of the stannaries may principally be dated.

Power to search for other metals besides tin was granted to individuals immediately from the crown, and we find that various persons held the right of searching for mines in the reigns of Edward III. Richard II. Hen. IV. and Hen. VI. In some of these grants, gold, silver, and copper are mentioned as well as lead.

The privileges of the tanners were not interfered with by any question relating to these metals, nor, on the other hand, did the jurisdiction of the stannaries extend to affairs connected with them.

Thus we find an appeal to the exchequer in the reign of Henry VI. relative to lead mines. *From the records. Easter term, anno 36. Regni. Devon Memorand.* “That John Bottwright, governor of the mines of Bury Ferrers in Devon, complains to this court that Robert Glover, at the command of Roger Champernown, took away 144 boules of glance oar, valued at 15*l.* 6*s.* 8*d.* and made profit of the same without any thing allowed to the king, to the king's damage of 100*l.* and thereupon desireth the advice of the court.”

The mines continued to be protected by the crown, and particularly by Henry VII., until Edward VI. when they were neglected; and fell into complete decay during the disastrous government of Mary.

When Elizabeth succeeded to the crown, the mines of the kingdom partook of the attention which this enterprising queen bestowed on every object from which an increase to the resources, or an addition to the strength of her government, might be derived.

The failure of the mines had diminished the number, and annihilated the skill, of the English miners; the queen therefore invited over Germans, and made extensive grants in different parts of England to Houghseter and Thurland, and likewise others to William Humphreys and Christopher Shutz. She also established, in 1568, a corporation, which still exists, called “The Society for the Mines Royal,” which had certain grants and privileges in several counties, and of

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which William, earl of Pembroke, was the first governor. It does not appear that this society, which was originally a mining company, though now engaged in smelting ores only, produced any important effect upon the discovery of metals in England; the tin mines of Cornwall were not worked by them, but remained in the hands of private adventurers, under the jurisdiction of the stannaries, and increased in produce and value in proportion to the demand for this metal. The whole amount of tin annually raised in Devon and Cornwall, in the following reigns of James I. and Charles, was from fourteen hundred to sixteen hundred tons. It is probable that the civil wars which succeeded injured the workings of the mines, as in the reign of Charles II. it appears from a note of Mr. Scawen, of Molinek, who was vice warden of the stannaries, and quoted by Dr. Pryce, that the tin revenues were very small.

In the reigns of Anne and George I. the produce of tin had again become considerable, and amounted, one year with another, to something more than sixteen hundred tons; so that in the space of 110 years its mean proportion was equal to fifteen hundred tons *per annum*.

Since the foregoing time a gradual increase took place in the ensuing thirty years; for in the year 1742 a proposal was made by the Mines Royal Company in London to raise one hundred and forty thousand pounds to encourage the tin trade by farming that commodity for seven years at a certain price. A committee of Cornish gentlemen were appointed to consider of the proposal; and they reported, "That the quantity of tin raised yearly in Cornwall, at an average for many years last past, hath been about two thousand one hundred tons;" and resolved, "That three pounds nine shillings for grain tin, and three pounds five shillings *per hundred*

weight for common tin, are the lowest prices for which such tin will be sold to the contractors, exclusive of all coinage duties and fees."

The produce of the tin mines was much more considerable afterwards, and from 1760 to 1780 it was reckoned at about two thousand eight hundred tons a-year, which was worth the annual sum of about 180,000*l*.

Copper began to be worked in Cornwall in the beginning of the 18th century, and the amount had attained at the period just quoted to about the same annual sum of 180,000*l*. making the mineral returns of this district at this period, *viz.* about 1780, to be of the yearly value of 360,000*l*.

The tin mines have not been so important to the Cornish miners since the discovery of copper as they were before, the produce of the latter having increased most rapidly, while the former have not made any proportional progress. As the subject is very interesting in estimating the power of this country to supply raw materials for its numerous manufactures, we shall give statements of the produce and other particulars of the tin and copper mines of Cornwall and Devon, from the early part of the last century to the present time.

We shall first state the produce of the tin mines, and afterwards give a more detailed account of the effect of the discovery of copper on the mining interest as well as the trade of the country.

The chief part of the tin in the following statement was produced from the mines of Cornwall alone, as although Devon had anciently yielded a large proportion of tin, yet before this period the mines, or rather the stream works of the latter county had become exhausted, and were incapable of producing any notable proportion of ore.

Account of the Quantity and Value of Tin raised in Cornwall and Devon, from 1700 to 1800.

Dates.	Number of Blocks 6½ to a Ton.	Number of Tons.	Price <i>per</i> Ton.		Periods.	Annual Quantity in Tons.	Annual Value.	
			£.	s. d.			£.	s. d.
1700 to 1720	208,000	32,000			20 years	1600		
1720 to 1740	273,000	42,000	66	0 0	20 years	2100	138,600	0 0
1740 to 1750	162,500	25,000	65	0 0	10 years	2500	162,500	0 0
1750 to 1760	172,779	26,580	63	7 6	10 years	2658	168,450	15 0
1760 to 1770	177,302	27,277	66	6 8	10 years	2728	180,957	6 8
1770 to 1780	178,737	27,498	60	2 0	10 years	2750	165,275	0 0
1780 to 1790	192,295	29,583	68	2 0	10 years	2958	201,439	8 0
1790 to 1800	210,928	32,450	73	1 0	10 years	3245	227,047	2 6

From this table we may observe a regular increase in the quantities raised, the improvements in mining which took place having contributed, without doubt, to produce this effect. The price of the metal did not advance in proportion to the increase of the charges on labour, and the enhanced value of the articles used in the mines, and therefore we cannot account for the greater produce from increased demand, but from the power derived by improved means of working, and thus of bringing the metal to market at a cheaper rate. About the year 1770 the quantity raised appears to have been greater than the demand required, and the price seems to have been lower than at any former period, which was probably likewise affected by the war, and by the influx of tin imported into Europe by the Dutch from their possessions in the East Indies, where it is raised as well as in England. The advance in price that followed in the next period, may be attributed to the revival of trade, in consequence of the

peace which followed the American war, but this again produced an over quantity in the market, followed by a depression in value, very injurious to the miners, which was severely felt about 1789, when, by the exertions of Mr. G. Unwin, an export of tin to China, through the East India company, took place, that absorbed the surplus which the European market did not require, and thus the price advanced again to a rate higher than any preceding one. This export to India has continued ever since, and may probably increase notwithstanding that tin is found in some considerable quantity in Asia.

From 1800 to the present time the tin mines of Cornwall have rather declined, and are probably gradually exhausting, this metal not being found to penetrate so far into the earth as copper, and therefore but few mines have been found to continue productive at very considerable depths.

Any decline that may have taken place in the tin mines of Cornwall has, however, been more than compensated by the rapid

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rapid advances which the copper mines have made in that and the neighbouring district, which of late years have been so great as to render them of the highest consideration, and to give these concerns the precedence over all similar undertakings of any country. For whether we consider the quantity of their produce, the immense capitals invested, the power and number of their engines, the skill with which they are conducted, or the spirited and rapid execution of the works, they will probably be found to take the rank here assigned to them.

Cornwall possesses many eminent advantages as a mining country, of which its maritime situation is among the most important, but another is that it is peopled by a race of men peculiarly fitted for this employment. The Cornish miners unite great courage to personal strength and activity, while we may observe in their character intelligence mixed with persevering enterprize, and patience of fatigue with a considerable independence of spirit.

There is no doubt but that the system of management adopted in the mines, which long usage has matured into a system as beneficial to the mine owners as stimulating to the exertions of the workmen, has tended much to render the latter what they now are, though their insulated situation has likewise probably preserved to them much of their original character as a people.

With such advantages, and with a sufficient quantity of the metallic ores distributed throughout it, a district only requires capitalists of sufficient wealth, intelligence, and enterprize, to render it of consequence as a mining country, and it has happened to Cornwall to have gentlemen possessed of all these requisites.

The statements which follow will shew how the discovery of a valuable metal has been followed up, and an intimate acquaintance with the Cornish mines would prove how great the exertions must have been, to have produced effects in a short time which the labour of ages in other countries have scarcely equalled.

We have before observed that copper began to be sought after in Cornwall about the beginning of the eighteenth century, and, as might be expected, we have no exact accounts of the success of the undertakings for its pursuit in their earliest stage. In a few years, however, the quantity produced had attained to a considerable amount, and we shall be enabled to trace pretty accurately the progress afterwards made.

The first document on the subject is the following:
Statement of the Returns of Copper Ores in Cornwall, from 1726 to 1775.

Years.	Tons of Ore.	Average Price per Ton.	Amount.	Annual Quantity of Fine Copper.
		£ s. d.	£	(Probably)
1726 } 10 } 1735 }	64,800	7 15 10	473,500	700 Tons.
1736 } 1745 }	75,520	7 8 6	560,106	830
1746 } 1755 }	98,790	7 8 0	731,457	1080
1756 } 1765 }	169,699	7 6 6	1,243,045	1800
1766 } 1775 }	264,273	6 14 6	1,778,337	2650

This account is taken from Pryce's "Mineralogia Cornubiensis," excepting the last column of the quantities of metal produced from the ores, which it was desirable to exhibit, in order to compare the increase of late years, of which the quantity of *fine copper* is the only true criterion, the ores often differing materially in their metallic content. The statement is, however, given as respects this part of it only as a near approach to the truth, as we have no certain data to calculate from; the assay and price of copper, by which the value paid to the miner was determined, being in a great part of the period above quoted not easily ascertained. The amount of metal is, however, calculated from the most probable supposition.

From the table we see, that in Cornwall the produce of copper increased in fifty years from about 700 tons of fine metal *per annum* to 2650 tons.

Copper mines were not attended to in England much before the dates in the preceding table, the discovery of this metal probably having taken place in working the tin mines, which had been wrought time immemorial. Soon after that discovery, in 1691, a charter was granted to Sir Joseph Herne and others, merchants of London, who were thereby incorporated as a company for the purposes of refining and purifying copper ores.

This company still exists, and is now commonly called the English Copper Company.

The Mines Royal Company, which had been incorporated near 100 years before this time, appear originally to have designed to apply their resources to the opening and working mines in various parts of the kingdom, and they had grants for searching for copper among other metals, although it does not appear that any important discovery of this metal took place in consequence of their exertions, nor is mining one of those pursuits which is ever likely to flourish in the hands of large companies.

In 1694, a copper coinage of halfpence and farthings took place, and government paid at the rate of 18*d.* a pound for the copper, which was of Swedish produce.

In 1717, a further coinage took place, to the amount of 700 tons of English copper, for which government paid at the rate of 15³/₄*d.* per pound, or 147*l.* per ton.

In 1702, the first brass work in England was erected near Bristol, which has continued to this time, but with great additions and improvements. Many other copper and brass houses have been since erected in this country, and by that spirit, energy, and enterprize, for which the people of it are so distinguished above all others, the most valuable branches of the copper and brass trade have been established in England, which had before been altogether, and for ages, carried on in Germany and Holland.

For the first twenty or thirty years of the last century, and always before, most of the copper and brass utensils for culinary and other purposes of this country were imported from Hamburgh and Holland, procured from the manufactories immemorially established at Nuremberg and various other parts of Germany; even brass pans for the purposes of the dairies of our country could not be procured but of the German make.

So late as 1745, 1746, and 1750, copper tea-kettles, saucepans, and pots of all sizes were imported here in large quantities from Hamburgh and Holland; but through the persevering industry, capitals, and enterprising spirit of our miners and manufacturers, these imports became totally unnecessary, being all made here, and far better than any other country could produce.

During all this time the price of copper will be found to have been as high as it has been in the last three or four years;

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years, 1808, 1809, 1810, and 1811, notwithstanding the great difference in the value of money, and consequent advance of price on materials used in mining, and of the wages of labour employed therein.

It appears above that government paid for copper used in their coinages in the year 1694 at the rate of 18*l.* a pound, or 168*l.* a ton for metal the produce of Sweden; and in 1717, they were supplied with English copper at the rate of 15³/₄*l.* a pound, or 147*l.* a ton.

The reduction here specified in value may fairly be accounted for by the increasing produce of the English mines, and accordingly the price went on to lower nearly in proportion to the quantity which was thus brought into the market.

In the year 1720 copper was sold for about 130*l.* a ton, and declined towards the year 1772 to the price of 100*l.* a ton.

About the year 1773, new copper mines being discovered in Derbyshire and Wales, and fresh supplies of fine copper coming from thence to market in competition with the Cornish copper, the price of it fell gradually until 1781. In this year the East India company first paid so little as 79*l.* a ton for cake copper. This great reduction was owing to a warm contest which took place between the owners of the Cornish mines and those of the Paris Mountain mine in Anglesea, which had become amazingly productive, and so as to alarm the fears of the former.

Arrangements were afterwards made between the parties principally concerned in the mines of these two districts, by which the price was somewhat advanced, but did not exceed at any time 84*l.* a ton, and continued at nearly the same rate until the year 1791.

By this time England, instead of depending upon foreign mines for a supply of copper, had become one of the principal sources from which the world at large was furnished with this useful metal.

Accordingly, in the year 1791 we find that the exports of different articles in which copper either formed the whole or the principal ingredient, amounted to a very considerable branch of trade, and that these articles went in large quantities to those very countries upon which England had formerly depended for a supply. Among these may be noticed Holland, Germany, and even Sweden itself.

The total exports were, in 1791,

	Tons.	C.	qrs.	lbs.	£	s.	d.
Wrought copper	3082	3	3	11	value 358,844	9	1
Brass and plated goods	2324	2	0	11	209,769	8	9
	5406	5	3	22	568,613	17	10

Comparing this with the produce of copper in Cornwall in the year 1775, as above quoted from Dr. Pryce, which was only 2650 tons, and allowing for what might be brought to market from Anglesea, we may, in some measure, judge of the increase in the quantity of metal from the Cornish mines in this period of sixteen years, even under the discouraging circumstance of great competition and reduced prices.

Besides this vast export, a new source of consumption for copper had in the mean time arisen at home in the use of it very extensively in sheathing and fastening ships, and this alone would require considerable quantities.

The demand having apparently kept pace with the quantity brought to market, the question will naturally be asked, how it happened that the price continued to fall, or at least to remain at a rate so much under what it brought 100 years before? Though the answer to this question must include other considerations than those connected with mere mining, it may be proper to go a little out of our way to answer it, particularly as it relates to the mines of Corn-

wall, which were at one time threatened almost with ruin, from the value of their produce not bearing any proportion to the increase in their expenses, from the diminished value of money, and the rapidly accumulating charges occurring from the great depths to which most of the productive mines were by this time worked.

The reason, then, of the price of copper not bearing a proportion to the cost of procuring it, and the demand of the article, appears to have been simply this. Neither the miners nor the great consumers of the copper were smelters of the ore; but this business was in the hands of a very few companies, employing immense capitals in their works, who thus had the power of managing the market, and of preventing that salutary competition, which alone can regulate fairly the due course of trade.

The principal smelters, by a contract which had been entered into improvidently with them by the majority of the miners, had possessed themselves of the greater part of the copper ores of the county of Cornwall at a fixed price; and this price being found inadequate to meet the increasing charges of working the mines, discontents arose, which spread among the labouring miners, who feared the loss of their employ by the ruin of the mines, which was anticipated. Many of the proprietors, or adventurers as they are usually called, who were not personally parties to the contract, refused to be bound by the act of their co-adventurers, and considerable confusion ensued.

The small proportion of the ores, not included in the contract, continued to go to public sale, where the price was advancing; but these sales were attended by a few smelting companies only who had not joined the others, until the following circumstance occurred, which materially contributed to open a free market to the miner for the sale of his ores, upon a plan that ensures a fair and equitable price, according to the demand, as far as is possible, where the number of buyers must be necessarily small.

Many of the principal manufacturers of Birmingham, who were large consumers of copper, had observed the difference between the price of the metal in the ore paid to the miner, and the price at which they bought it when smelted. They saw no other reason for the intervention of a third party between the miner and consumer, but the capital necessary for the erection of smelting works; and this being easily raised by shares, a company was formed under the name of the Birmingham Mining and Copper Company: their object being to encourage the production of copper, by adventuring in the mines, as well as to procure it for their manufacture, by purchasing and smelting the ores.

As soon as the company was established, they proposed to revive the old mode of the sale of ores, which had, owing to the contract, nearly fallen into disuse, called a *ticketing*; by which, on certain days, the ores of any number of mines, being previously sampled and assayed, are offered for sale by tenders or tickets, produced by the agents of each smelting company, and delivered to the chairman of the meeting which is held for the purpose, who declares the offer of each, and the highest the buyer.

This revival of the ticketings was effected by the Birmingham company joining the small number of smelting companies who were not concerned in the contract, and the competition was rendered complete. A new spirit was infused into the working mines, by an increase of the price of their produce. Other smelting companies were afterwards formed upon similar principles; and the demand for copper advancing rapidly, while the quantity produced in Anglesea and other parts of England lessened, the mines of Cornwall flourished in proportion.

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The advance on copper began to be felt about 1792, when it had attained the price of 100*l.* per ton; and in a very few years after (1799), it had reached 124*l.*: being still, however, much lower than it was in the beginning of the 18th century.

We may recollect that the quantity of copper raised in Cornwall, in the year 1775, was about 2650 tons a year; in 1789 it had increased to about 3000 tons; which increase was progressive, as in the year 1797, according to the report laid before the house of commons, the quantity amounted to 5093 tons; and in the following year (1798), was 5427 tons.

So that we see in the period of about 70 years from 1726, the annual quantity produced by this district had risen from 750 to 5427 tons; and that the aggregate amount of an article, valuable as a raw material, affording, after it passes from the hands of the miner, the means of subsistence and profit to thousands, had risen from the sum of 47,35*l.* to about 600,000*l.* a-year. Even this great increase of produce was far exceeded in the course of the next eight or nine years, when, as we shall see hereafter, half as much more was added to the quantity, and more than that proportion to the value.

Early in the year 1799 the Birmingham manufacturers, finding the price of copper rapidly increasing, began to be alarmed lest a diminution of their trade should be the consequence, and having apparently overlooked the plain rule of commerce, that, without unfair restraint, demand must govern price, applied to government to impose prohibitions on the export, and other regulations, which would have amounted in effect to the fixing a maximum on the price, and consequently a ruinous restraint on a valuable source of national wealth, and laudable enterprise and exertion. It may be justly wondered at, that any ministry should have listened to such a proposal; but great as were the boasted talents of the then premier, he appears to have been led to the warm support of it, by the narrow consideration which was held out to him, of supplying the navy with copper at a somewhat lower price; not looking forward to the probability that any step which might ruin the British copper mines, must eventually make the British navy dependent on other countries for this essential article of equipment.

The contest that ensued between the miners and the manufacturers produced many curious documents, which were laid before the committee of the house of commons appointed to investigate the subject, and from which we are now enabled to state particulars of the mines of Cornwall, more exactly than could have been obtained, had not such an occasion called them forth.

The matter came fully before parliament, the good sense of which defeated the impolitic wishes of the proposers of the restrictions, and left a ministry unaccustomed to defeat in a minority on the question.

That the predictions of the manufacturers were groundless may be inferred from what took place afterwards: the price of copper advanced 50 per cent. in the next seven years, and the Birmingham trade, notwithstanding, increased in activity and consequence. The high price stimulated the enterprise of the miner, until an over-supply began to operate; and in the last few years, this, together with the unfortunate state of foreign trade, has again reduced the price of copper, so as once more to endanger the existence of a great proportion of the copper mines.

From the documents before alluded to, we find that, in February 1799, there were in Cornwall then working sixty copper mines, which were divided into classes, to shew their relative conditions. The accounts are made up for the six months preceding the statement.

Class 1. Includes the old deep mines, which produced in the six months more than half of all the copper raised in Cornwall.

2. Includes the profitable mines, which produced about three-eighths of the copper.

3. The new mines which were carrying on in the hopes of their improvement, and the greater number of which, in fact, had not begun to yield any ore.

The result of the statement is as follows, in which it is to be observed that the value of the ores is accounted for, after deducting the proportion paid to the owner of the soil, and therefore does not exhibit an account of all that was raised. The first column of loss refers to the money sunk in the six months for which the account is taken; and the last column of unrecovered loss includes all the money laid out from the commencement of each mine, which had not been paid off by adequate returns.

State of the Copper Mines of Cornwall for six Months, to the end of February 1799.

	Quantity of fine Copper.			Adventurers' Amount of the Value.			Cost of working the Mines.			Total of Profit on some Mines.			Total of Loss on others.			Capital employed in the Mines.			Unrecovered Loss.		
	Tons.	C.	q. lbs.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Class 1. — Including ten old and deep mines	1388	3	1 21	115,121	13	10	116,209	1	6	3153	0	3	4240	7	11	102,489	0	0	69,181	2	10
Class 2. — Seven profitable mines	1083	12	2 24	86,377	15	3	49,311	11	1	37,066	4	2				66,813	0	0	5483	17	2
Class 3. — Forty-three new mines, of which thirteen only had begun to raise any ores	141	17	1 13	14,517	13	5	31,813	5	9				17,295	12	6	16,267	0	0	90,124	16	8
	2613	13	2 2	216,017	2	4	197,333	18	4	40,219	4	5	21,536	0	5	185,569	0	0	164,789	16	8

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By this statement we see, that the total profit of the six months, in all the mines, exceeded the loss by the sum of 18,683*l.* 4*s.* 0*d.*, and in the loss is included a considerable amount, which it does not seem clear should have been placed there, *viz.* the sums expended on the new mines in the period, as this may more properly be called an investment of capital with a view to future expected profit.

The unrecovered loss is subject to the same remark, though it is usual to reckon in mining the expenditure as loss until the profits have repaid it. The capital, however, which means the value of stock upon the mines, ought to be deducted from this unrecovered loss; and if this be done, and a fair allowance be made for the value of such new mines as might have been supposed likely to become profitable, the

account gives no unfavourable impression of the general result at that time.

Another observation may be made on this account which seems necessary, as it does not appear on the face of it. Credit is only given for the adventurers' part of copper ores; but several of these mines returned tin as well as copper, of which no account is taken, and which must, in all probability, have increased the profits of the six months, if stated.

The next table shews the general receipts and disbursements on the copper mines of Cornwall for seven years, ending the 31st December, 1798, which cannot be deemed so favourable as the former, which related to the latter part of this same period.

General State of the Copper Mines of Cornwall for Seven Years, ending the 31st of December, 1798.

Years.	Adventurers' Amount of Ores.			Labour.			Materials.			Total Cost.			Profit.			Loss.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1792	279,331	15	10	150,824	12	3	91,361	6	4	251,865	19	11	27,465	15	11			
1793	283,853	12	11	176,333	2	7	110,122	15	2	294,226	15	0				10,373	2	1
1794	293,853	10	11	179,187	15	5	111,093	19	11	294,775	19	5				922	8	6
1795	305,320	6	9	189,713	10	1	111,640	2	3	312,047	7	5				6727	0	8
1796	348,836	12	11	201,995	18	6	105,925	12	1	324,897	18	4	23,938	14	7			
1797	320,606	15	9	189,821	15	11	109,008	7	3	309,060	14	10	11,546	0	11			
1798	405,488	15	9	253,601	12	3	146,253	16	3	408,248	7	11				2759	12	2
	2,237,291	10	10	1,341,478	7	0	785,405	19	3	2,195,123	2	10	62,950	11	5	20,782	3	5

N. B.—The columns of labour and materials, added together, do not make up the total cost, because the accounts sent from some mines do not distinguish the amount of labour from materials; and, therefore, could be no otherwise arranged than by being carried at once to the column of total cost.

The average annual cost of working the copper mines of Cornwall for this period appears to have been 313,589*l.* Out of this sum the labour appears to have cost about 197,640*l.*, and the materials employed about 115,950*l.* The proportion of the one to the other being nearly as 5 to 3.

The great amount of the latter may be attributed to the great depth of many of the mines, whereby the charge for coals for the steam-engines, and the wear and tear in the shafts of cordage and other articles, is prodigiously increased.

If, taking the amount of labour at the above sum, we allow 40*l.* as the annual earnings of each man employed, which is nearly the usual proportion, we shall find it would shew that there are about 5000 men employed. But as a certain proportion belongs to the boys working under ground, and the women and children who dress the ores on the surface, who altogether are paid after a much lower rate, the whole number of hands, including men, women, and children, may

not, at this period, perhaps be over-rated at from 6 to 7000.

In order to shew the respective state of each mine at this time, we insert the following table, which exhibits the name of each, with the particulars of their expenditure and returns, as far at least as copper is concerned; for, as was remarked before, no notice is taken of the tin produced from any of them.

We take the year 1798, the last of the seven years to which the statement given above refers to.

Such is the fluctuation of concerns of this sort, that at the present time, 1812, very few of those which appear at the head of the following list as most important in consequence and produce, are now working to much extent, while others, which either then lay neglected, or in which discoveries had not been made, have succeeded to supply their places.

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State of the Copper Mines in Cornwall for the Year 1798.

Mines.	Adventurers' Amount of Ores			Labour.			Materials.			Total Cost.			Profit.			Loss.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
North Downs -	52,388	14	6	33,350	2	1	18,890	19	9	52,241	1	10	147	12	8			
United Mines -	30,194	8	4	2,196	0	3	20,241	19	3	40,437	19	6				4243	11	2
Consolidated Mines	35,613	11	10	21,547	4	2	1,577	14	0	32,424	18	2	3188	13	8			
Herland -	29,233	10	9	16,922	2	0	13,789	11	6	30,711	13	6				1474	2	9
Stray Park and } Wheal Gons }	12,125	10	10	6660	11	0	3182	13	0	9843	4	0	2282	6	10			
Poldice -	6993	19	9	4945	19	3	5677	3	1	10,623	2	4				3629	2	7
Wheal Unity -	41,330	8	7	10,851	2	5	13,510	17	10	24,362	0	3	16,968	8	4			
Crenver and Oat- } field }	19,429	14	7	9392	10	2	10,016	9	11	19,409	0	1	20	14	6			
Wheal Treafury -	19,978	4	10	20,50	18	8	5541	4	2	25,592	2	10				5613	18	0
Cook's Kitchen -	18,098	5	4	16,102	2	4	3468	13	7	19,570	15	11				1472	10	7
Wheal Rock -	995	19	7	1533	5	6	417	10	4	1950	15	10				954	16	3
Tin Croft -	35,242	17	1	15,233	10	2	6105	4	3	21,338	14	5	13,904	2	8			
Trefavean -	7609	2	9	5437	1	9	3069	2	3	8506	4	0				897	1	3
Prince George -	12,538	16	5	9045	3	5	1068	4	0	10,113	7	5	2425	9	0			
Camberne Veau -	6456	17	3						2885	1	2	3571	16	1				
Wheal Jewel -	19,035	18	2	10,710	6	8	5311	3	3	16,021	9	11	3014	8	3			
Pednandrea -	5078	7	10	10,587	16	8	7287	9	1	17,875	5	9				12,796	17	11
Wheal Fortune -	20,767	0	3	9450	18	7	2560	13	10	12,011	12	5	8755	7	10			
Wheal Gorland -	9032	0	8	3975	17	0	1893	19	5	5869	16	5	3162	4	3			
Wheal Providence	257	8	0						252	7	4	5	0	8				
Wheal Hope -				400	3	6	247	9	6	647	13	0				647	13	0
Scorrier -	102	14	6	509	10	6	103	14	7	613	5	1				510	10	7
Cherry Garden -	22	13	9	321	3	0	56	11	11	377	14	11				355	1	2
Wheal Sufan -	1407	8	9	1956	13	0	1465	1	8	3421	14	8				2014	5	11
Wheal Squire									820	3	7					820	3	7
East Wheal Spar- } non }				356	6	3	45	10	5	401	16	8				401	16	8
Drollas Downs -	1075	14	7	1847	5	11	41	19	2	1889	5	1				813	10	6
Wheal Captain -	643	9	9							1617	16	7				974	6	10
Creegbraws -	77	3	10	1054	7	3	154	18	6	1209	5	9				1132	1	11
West Wl. Unity -										83	19	9				83	19	9
Wheal Penrose -				108	6	8	12	0	2	120	6	10				120	6	10
Wheal Tremayne -				127	14	5	2	19	0	130	13	5				130	13	5
Wheal St. Aubyn				53	19	10	15	1	3	69	1	1				69	1	1
Rose Lobby -				270	7	8	138	9	5	408	17	1				408	17	1
Heart's Ease -				273	13	8	4	19	10	278	13	6				278	13	6
Bosprowall -	1377	11	3	1413	1	0	398	5	2	1811	6	2				433	14	11
Druid -	17	18	11	421	12	4	264	5	1	685	17	5				667	18	6
Wheal Fanny -				640	16	4	468	19	6	1109	15	10				1109	15	10
New Roskeir -	475	19	3	1106	9	3	1280	1	2	2386	10	5				1910	11	2
Polgine -										1220	3	9				1220	3	9
Wheal Christoe -				43	7	10	10	19	0	54	6	10				54	6	10
Wheal Drim -										56	16	5				56	16	5
Dopps -	15	10	0	241	12	7	31	9	10	273	2	5				257	12	5
Nanjiles -				71	3	7	18	18	0	90	1	7				90	1	7
West Downs -				612	2	10	187	13	2	799	16	0				799	16	0
Wheal Abraham -				1618	11	5	815	18	5	2434	9	10				2434	9	10
West Good Success				156	12	2	34	7	9	190	19	11				190	19	11
Whitefield -				418	3	6	198	5	4	616	8	10				616	8	10
Wheal Pink -										118	18	9				118	18	9
Penfruthell -				195	11	2	33	18	7	229	9	9				229	9	9
Wheal Damfel -				373	14	5	101	16	5	475	10	10				475	10	10
Wheal Quick -	121	17	7	537	9	5	204	13	2	742	2	7				620	5	0
North Good Success				81	0	5	1	6	7	82	7	0				82	7	0
Carried over	393,738	19	6	241,203	12	0	139,250	5	1	387,509	4	5	57,446	4	9	51,216	9	8

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Mines.	Adventurers' Amount of Ores.			Labour.			Materials.			Total Cost.			Profit.			Loss.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Brought over	393,738	19	6	241,203	12	0	139,250	5	1	387,509	4	5	57,446	4	9	51,216	9	8
Wheal Bounty				122	9	10	61	11	4	184	1	2				184	1	2
Wheal Rachel				123	6	5	20	1	9	143	8	2				143	8	2
Wheal Royal										66	16	1				66	16	1
Wheal Clinton				60	2	0	38	9	8	98	11	8				98	11	8
Tolcarne	641	6	1	1248	0	9	532	12	4	1780	13	1				1139	7	0
West Tolcarne	13	4	8	98	3	2	24	13	8	122	16	10				109	12	2
Wheal Union				102	14	0	20	10	6	123	4	6				123	4	6
East Wheal Vogue				71	15	4	17	3	0	88	18	4				88	18	4
Wheal Spinster				36	2	6	4	5	4	40	7	10				40	7	10
Trefkerby				111	8	4	14	16	3	126	4	7				126	4	7
Cardrew	30	2	6	212	2	0	23	14	0	235	16	0				205	13	6
Wheal Leeds	39	6	4	430	19	9	447	11	5	878	11	2				839	4	10
Trenethick Wood										685	6	5				685	6	5
Wheal Nuttal	639	9	8	641	17	8	18	2	11	660	0	7				20	10	11
Trefkrow	7495	14	8	5375	19	8	2576	18	10	7952	18	6				457	3	10
Penberthy Crofts	281	2	9	1912	0	6	686	8	3	2598	8	9				2317	6	0
Wheal Kayle				135	17	3				135	17	3				135	17	3
East Wheal Park				345	5	6	160	6	0	505	11	6				505	11	6
Wheal Ruth				136	9	5				136	9	5				136	9	5
Wheal Carpenter										53	1	11				53	1	11
Wheal Chance										226	14	0				226	14	0
West Wheal Jewel	1551	17	5	1243	6	2	2356	5	11	3599	12	1				2047	14	8
Wheal Bog, ore and materials fold	1057	12	2							295	13	7	761	18	7			
	405,488	15	9	253,611	12	3	146,253	16	3	408,248	7	10	58,208	3	4	60,967	15	5

About this period a part of the county of Devon began to attract notice as a mining district, although it might rather seem to belong to Cornwall, if a division had been made between the counties by a line that an observer of the geology would have chalked out, rather than by the arbitrary limit of a river. The mines of Devon may, therefore, fairly be ranked as a branch of the great mineral country adjoining, as their features are nearly alike, the products very similar, and the system of working derived from Cornwall. A space of no inconsiderable extent indeed is to be found lying between the western and most considerable mines in Cornwall, and those on its eastern limits, which intervening tract is comparatively unproductive in mineral treasures.

The tin mines of Devon have been before alluded to, and we have seen that they had gradually declined into insignificance. Copper had now been found, and pursued with some success, and though the quantity was not very great at this period, it soon led to greater exertion, which in turn was repaid by the discovery of new mines and an enlarged return of valuable produce.

It is probable that before 1800 the mines of Devon, which are mostly situate within a few miles of the town of Tavistock, did not yield more in any one year than about 100 tons of fine copper, and even this was a very recent discovery; we shall now see that they went on, together with those of Cornwall, augmenting in importance.

From 1798 to 1804, the produce of the Cornish mines appears to have continued pretty steadily at about 5500 tons of fine copper a-year; while the Devon mines in the same period increased their returns very rapidly, which had reached, about this time, to about 300 tons of fine copper a-year.

The price of the metal we mentioned to have been, in 1799, about 124*l.* a ton, and until 1804 a gradual increase was experienced, although the supply was at least somewhat larger. In the following year, however, owing to the flourishing state of the export trade, the value of copper rose very rapidly, and reached the unprecedented price of 180*l.* a ton to the miner. The consequences of this were soon felt, and, by the exertion produced by this stimulus, the returns of the Cornish and Devon mines reached to more than 7000 tons of fine copper, fetching, at the first hand, the sum of 1,260,000*l.*

From this time to the present, the value of copper has experienced violent and rapid fluctuations, being, at one time, at half the price of the year 1805; and as this has proved a cause of great embarrassment and loss to the adventurers in the mines, so it has tended to reduce again the quantity of copper raised.

The year or two following 1805 were, as might be expected, even more productive than that in which the price attained its highest pitch, for the exertions it caused operated long after the price began to decline.

MINING.

The following Table exhibits a Statement of the Quantity of Copper Ores and Fine Copper produced by the Mines of Cornwall and Devon during the last four Years, taken up to the End of June in each Year, and the Value calculated according to the Average Standard, or Miner's Price of the Metal

		Copper Ores.			Fine Copper.				Average Standard <i>per Ton.</i>			Annual Amount after deducting Charges of Smelting.		
		Tons.	cwt.	qrs.	Tons.	cwt.	qrs.	lbs.	£	s.	d.	£	s.	d.
1808	Cornwall -	73,434	2	1	7118	5	1	17	107	0	0	781,348	16	7
	Devon -	3725	0	0	369	10	0	0						
		77,159	2	1	7487	15	1	17						
1809	Cornwall -	72,038	12	2	6972	17	0	24	122	0	0	875,784	2	3
	Devon -	3210	0	0	365	1	3	0						
		75,248	12	2	7337	18	3	24						
1810	Cornwall -	76,525	14	3	6651	18	2	5	141	0	0	969,376	19	0
	Devon -	3713	0	0	354	15	0	0						
		80,238	14	3	7006	13	2	5						
1811	Cornwall -	70,039	0	1	5948	7	0	22	125	0	0	767,379	4	0
	Devon -	3540	0	0	323	13	0	0						
		73,579	0	1	6272	0	0	22						

We have now brought the history of the copper mines up to the present period, and we have found what has been done in one district in the space of about 100 years after the discovery of the metal. We may observe, that in the beginning of the 18th century the annual produce of the mines consisted of about 6500 tons of ore, and 700 tons of fine copper, yielding to the miners, who, from their ignorance of the subject, did not then receive from the smelters a price for their ores adequate to the value of the metal they contained, no more than 45,000*l.* a-year. And we have found this produce increased, at the early part of the present century, to the annual quantity of near 80,000 tons of ore, yielding more than 7000 tons of fine copper, worth to the miners an annual sum little short of 1,000,000*l.*

The copper mines now working in Cornwall and Devon may be known from the following list, which contains such only as are more or less productive, and does not include such as make no returns, but may, notwithstanding, be prosecuting with a view to future discovery, many of which kind were stated in the former account of the mines working in Cornwall in 1798.

By referring to that statement, we shall find the productive mines to be forty in number, and the unproductive to amount to thirty-six.

The following list will be found to contain sixty-one productive mines, with the quantity of ores estimated from the account of sales at the ticketings, where the computed weight of each parcel of ore is stated, and the exact quantity determined after the sale has taken place.

It is possible that some few mines may exist which do not appear in this list, and which sell their ores by private contract, but they are not important.

We subjoin to the list the Devon mines, with their quantities of ore, taking account, as in Cornwall, of such only as are productive; and the whole is made up to the end of December 1811.

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A list of Copper Mines, with the Quantities of Ore offered for Sale at the Ticketings from each; in the Year 1811.

In the county of Cornwall there are 61 mines.

Names of the Mines.	Tons of Ore.
Wheal Alfred -	8946
Dolcoath -	8544
Wheal Unity -	5545
Wheal Abraham -	3950
Poldice -	3659
Wheal Damsel -	3357
Gunnis Lake -	2600
West Wheal Fortune -	2594
Wheal Towan -	2158
Wheal Fanny -	1802
Crennis -	1696
Oatfield -	1630
Treskirby -	1578
Wheal Gorland -	1485
Cook's Kitchen -	1342
Crenver -	1287
Tin Croft -	1138
North Downs -	1153
Wheal Friendship -	1038
Wheal Jewel -	968
Wheal Virgin -	942
Saint George -	938
United Mines -	934
West Wheal Virgin -	921
Wheal Fortune -	916
Wheal Quick -	679
Camborne Vean -	655
Wheal Chance -	597
Wheal Spinster -	584

Carried over 63,636
4 I

Wheal

	Brought over	63,636
Wheal Neptune	- - -	539
Wheal Gons	- - -	443
Godolphin	- - -	411
Creegbraws	- - -	316
Trefavean	- - -	311
Nangiles	- - -	266
Botallack	- - -	244
Penberthy Crofts	- - -	212
Wheal Clinton	- - -	209
Chacewater	- - -	204
Wheal Baffett	- - -	204
Wheal Dolphin	- - -	183
Wheal Druid	- - -	177
United Hills	- - -	177
Benner Downs	- - -	175
Wheal Maid	- - -	151
Wheal Strawberry	- - -	148
Union	- - -	146
Wheal Music	- - -	145
Wheal Sparnon	- - -	97
Wheal Maudlin	- - -	95
Wheal Margaret	- - -	90
Wheal Lushington	- - -	81
Unanimity	- - -	49
Wheal Squire	- - -	45
Relistian	- - -	41
Wheal Spearn	- - -	20
Wheal Mary	- - -	20
Trenowith	- - -	18
Wheal Freedom	- - -	16
Roskear	- - -	10
Rosewarne	- - -	7
		<hr/> 68,886

In the county of Devon seven Mines.

Wheal Friendship	- - -	1102
Wheal Crebor (<i>Tavistock Canal</i>)	- - -	1308
Wheal Crowndale	- - -	863
East Crowndale	- - -	913
Ding Dong	- - -	250
Wheal Hope	- - -	6
Wheal Huckworthy	- - -	10
		<hr/> 4,452
		<hr/> Tons 73,338

Hence it will appear, that the copper mines have of late been declining in their produce, which is to be referred to the general state of trade rendering the price of the metal unequal to the charge of producing it.

The present value of copper, as was observed in a former part of this article, is as low as it was 100 years ago, and we may account for the possibility of this happening without absolute ruin to the mines, by the facilities which the great improvements in all the various operations of mining have given for lessening manual labour and consequent expence.

This very improvement has, however, contributed to a more rapid exhaustion of the ores, and though discovery has hitherto in this district kept pace with the gradual waste, yet it is impossible not to foresee that as the country is even now very fully explored, a time must arrive when the quantity of metal produced will grow less, and the price in consequence must advance.

This period we conceive is not so distant as some may imagine, but it is a subject not easily reduced to any very probable calculation.

The history of the mining of a particular district would naturally lead to an interesting enquiry on this subject, and to the discussion on the probability of a future and continuing supply of the metals which the bowels of the earth have hitherto yielded so abundantly. As this question regards one country, it may be assumed that the supply must have its limits; as it regards the whole world, it becomes difficult even to conceive what extent or number of deposits of metal may exist.

That certain districts may become exhausted is more than probable, but others now unexplored by the hand of man may be found. New powers, as far surpassing those of the steam engine as they did all former ones, may give the means of penetrating the earth to depths now unattainable, and veins may hereafter be followed to situations which are forbidden at present by the value of their produce or the want of sufficient exertion.

The stores which the earth yields from its bowels are unlike those which its surface produces; the former are limited and are not renewed, the latter are constantly produced by the encouraging hand of industry. The one are gradually exhausting, and seem to demand frugality in their expenditure, the other grow and increase in proportion to our care and exertion.

The result of a gradual exhaustion of mines now existing seems likely to be this; at first the price of metals will increase in proportion to their scarcity, this advance in value will lead to a greater produce by new efforts even in the districts which are exhausting, and after these begin again to fail, which they will do more rapidly from the increased exhaustion, new districts will be sought after, and perhaps uncultivated countries even become peopled by the want of what is now become so necessary to human life.

The variation in these affairs may at some time make material changes in the state of civilization, a position which will not be denied by those who duly consider the effects that the stores of coal and metal have had on the prosperity of Britain.

MINING Processes, according to the practice of the mineral districts of Cornwall and Devon.

The means pursued for the discovery of veins containing metal, and the appearances which serve as indications of the probable quantity which may be found in them, are treated of in a former article. See *LODE*.

The works which follow the discovery are at first but simple and limited, but they increase afterwards in proportion as the prospects of future success become more certain; or, on the contrary, they are discontinued when the trial offers but little encouragement to proceed with the adventure.

By a reference to the article above quoted, it will be understood how the deposits of metal are usually situated in the veins; and as the miner's object in his first operations is to get at some shoot or bunch of ore as quickly as possible, and to open as much of the lode as he conveniently can, the most promising part on the surface is chosen for the commencement of a *shaft*, which is either sunk upon the vein so as to follow its dip or underlay, or otherwise is carried down perpendicularly from some spot on the side to which it dips, so as to intersect it at a given depth, and then is usually called an *underlayer*.

As water is commonly soon met with in such quantities as to impede the workmen, means for removing it must be provided, and it speedily becomes necessary to take steps for this purpose. Where the elevation of the ground will admit of an *adit* or water-level being made, this is usually first had recourse to, particularly when it may be obtained by driving a moderate

a moderate distance, or when it can be pursued on the course of the lode, and to serve the double purpose of a drain and a level for trying the appearance of the vein.

When the shaft becomes deeper than the adit, or indeed when the latter cannot well be had, machinery to draw out the water is erected and employed, such as steam-engines, or overshot water-wheels where streams to drive them can be obtained: in both cases these engines are employed to work pumps to raise the water.

As soon as a shaft is sunk sufficiently deep, and it becomes desirable to pursue the lode horizontally, it is stopped for a time, and a level is commenced on each side of it, and this is usually continued in two opposite directions upon the course of the vein. The ends of this level being driven out of the way of the shaft, sinking may again be undertaken, and continued until it is deemed proper to drive another level; and thus a succession of these galleries or drifts are opened under each other, and the vein is divided into parallel portions, which are left to be worked for the ore contained therein, and which portions are called *backs*.

New openings to the surface from these levels are afterwards made by sinking more shafts at proper distances, and communications from one level to another are formed by sinking a kind of small underground shaft, called a *winze*, probably because the only machine employed in their execution for hauling the stuff is the common windlafs, which, in Cornwall, has generally the same abbreviated or corrupt appellation.

When a mine is put into this state, and any quantity of ore discovered, proper engines provided with sufficient power to admit the constant deepening of the mine by keeping the bottom of the engine shaft, called the *sump*, dry, so as to be regularly sinking: when the ventilation is completed by proper means for that purpose, and machines constructed for hauling up the ores and waste to the surface called *whims*, a mine, in the technical language of Cornwall, is said to be in due course of working.

The agents who attend daily to the works are called *captains*; they contract with the different classes of miners, and direct the operations, under the orders either of the principal adventurers, or a manager appointed by them.

The shafts and levels are kept regularly sinking and driving to lead to further discovery, or to open more of the lode for working, and the parts of the vein or lode left between the passages thus made are worked away, where the ore will pay the expence of so doing, by men, who contract for this work within certain limits, being paid a proportion of the value when merchantable, which is called a *tribute*, and which varies with the degrees of facility with which the ore can be procured, either from the different states of richness of the lode, or the hardness or softness of the rock which must be broken to obtain it.

The ore is usually conveyed in wheelbarrows through the levels under ground by boys to the nearest shaft, and there raised in buckets or *kibbles* to the surface. These kibbles are wound up by the whims, which are turned either by horses, steam, or water.

In preparing the ores for smelting, a variety of processes is employed, which require the labour of many hands; these are carried on upon the surface, and chiefly by women and children. The object being to separate from the ore both the stony and sparry waste, and the mundic or other useless metallic mixtures with which it is combined, considerable skill is required, from the different specific gravities of the various substances, which render it impossible by mere washing to separate the ores entirely from the different mixtures which accompany it.

To dress ore properly, it is essential that the whole should first be brought into such a state of division, that the different parts may be separated by washing or sifting: and, therefore, the richer the slate in which the whole is raised from under ground, the less the labour required in breaking or stamping. The better parts of the ore are broken to a proper size for smelting, either by flat hammers, or, as is now usual in the mines in Devon, by iron cylinders driven by water. For the coarser parts much more labour is required in stamping, sifting, and washing, the particular detail of which will be found under the article *Ore*.

The stamping-mills, and other apparatus for dressing the ores, are usually fixed as near the mouths of the shafts on the surface as possible, consistently with the power of leading streams of water to them. And plots, or *floors*, are prepared near them for receiving the merchantable ores until they are sold to the smelting companies.

The management of these processes is usually confided to a *dresser* or *grafs captain*, who regulates the whole, the expence being borne by the men who raise the ore on tribute, who take their proportion of the value according to the amount of the sales, and, therefore, pay every previous charge.

The erections on the surface of a mine comprize, besides steam or water-engines, whims, stamping-mills, and sheds on the dressing floors, a suitable counting-house for the captains and clerks, where the people are paid monthly, and the bargains or contracts made by a kind of public auction. A forge, or blacksmith's shop, accommodated to the extent of the mine, where men are generally at work by night as well as by day, to sharpen tools as well as to make or repair the iron-work of the different engines. A carpenter's shop, or *timber-house*, for work of that description, which is always going on to a considerable extent.

From the account given in the *History of MINING*, and the statement of the disbursements and returns there exhibited of all the concerns of that description in Cornwall and Devon, it may be seen how extensive some of them are in that respect. It may further be here observed that great depth has been attained in many of the older ones; in Dolcoath, which we believe is rather the deepest, the lowest part is somewhat more than 220 fathoms from the surface. Some individual mines in Cornwall employ near 1000 persons, and have several steam-engines working for the different purposes of pumping the water and raising the ore. In the county of Devon, streams of water being at hand, large overshot wheels are employed for working the pumps, and several have been erected of late years equal in power to the larger steam-engines. Within a very late period, the same economical means have been applied in a very ingenious manner to the winding up the ores from under ground, which, from the crookedness of the shafts of copper mines, was a work of more difficulty than might at first appear.

We propose to give more detailed accounts of the processes of breaking, raising, and dressing the *Ores*, under the article bearing that title; and shall describe the operations of sinking shafts and driving the levels from them under the head of *SHAFT*. The pump-work of mines, and the means for ventilating drifts, will be treated of in their proper places.

MINION, in *Geography*, a small island in the straits of Mozambique, near the W. coast of Madagascar. S. lat. 12° 40'. E. long. 49° 32'.

MINION, a sort of cannon, or piece of ordnance, of which there were formerly two kinds; large and ordinary, answering to our six-pounders. See *CANNON*.

MINION is also the name of a type used by printers.

MINISH, or MYNISH, in *Geography*, one of the many islands on the west coast of the county of Galway, Ireland. It belongs to the barony of Ballinahinch.

MINISINK, a town or rather village of America, in New Jersey, in the N.W. corner of the state, and on the W. side of Delaware river; 57 miles N.W. of Brunswick. —Also, a township of Orange county, New York; containing 3594 inhabitants.

MINISTER, one that serves or conducts the public worship of God.

In the reformed church, priests, or those ordained to preach and do the other functions of the priesthood, are called absolutely and simply ministers.

In which sense, bishops, &c. are said to be ministers of God, ministers of the Word, of the Gospel, &c. In some churches they are also called *pastors*.

MINISTERS of the *Altar* are properly those who attend and assist the priest at the administration of the eucharist. See DEACON and SUBDEACON.

Officers of state, &c. are called the king's ministers; as administering the affairs of justice, policy, &c. for him.

MINISTER of *State*, is he with whom a prince entrusts the administration of his government; or to whom he commits the care and direction of the principal affairs thereof.

Boethius is proposed as a model for ministers of state.

The grand vizier is the prime minister of the Ottoman empire.

MINISTERS, *Foreign*, or the ministers of foreign princes, are their ambassadors, envoys, agents, or residents in the courts of other princes.

There are two kinds of foreign ministers. Ministers of the first rank, who are also called *ambassadors*, and *envoys extraordinary*.

And ministers of the second rank, who are the ordinary residents.

Those of the first rank have a representative character, which the others have not; though these last are sometimes invested with fuller powers than the former.

MINISTER is also the title which certain religious orders give to their superior.

In this sense we say, the minister of the Mathurins, or Trinitarians.

MINISTER, among the *Jesuits*, is the second superior for each house; thus called, as being an assistant to the superior, or rector.

The general of the Cordeliers order is also called the *minister-general*. See JESUITS.

MINISTRY, or MINISTRY, a profession, office, or employment, which a person discharges for the service of God, the public, or some particular person.

In which sense we say, a bishop must account to God for his ministry, &c.

MINISTRY is also used for the government of a state, by some great minister, under the sovereign authority.

In which sense we say, the ministry of the cardinal de Richelieu, &c.

MINISTRY is also frequently used as a collective word, signifying the ministers or officers of state.

Thus we say, the ministry opposed a thing; meaning the ministers opposed it.

MINITOBA, in *Geography*, a lake of Canada, 100 miles long, and from 10 to 15 wide. N. lat 50° 40'. W. long. 100 20'.

MINIUM, in the *Natural History of the Ancients*, a name given to what we now call cinnabar, or native mineral of a shining red colour, out of which quicksilver was extracted. See MERCURY.

As the prepared cinnabar is much preferable to the native as a pigment, it has long been a considerable article of chemical manufacture; and the Dutch having had the reputation of making the best, we shall subjoin their method of proceeding, given by M. Tuckert (*Ann. de Chem. iv. p. 25.*) cited in Aikin's Dictionary. This manufacture consists of two distinct operations, the one being the preparation of the æthiops, the other the conversion of the æthiops into cinnabar. To make the æthiops, a boiler of iron polished on the inside, and about 2½ feet in diameter, and 1 in depth, is charged with 1080lbs. of mercury, and 150lbs. of sulphur (or *per cent.* 87.8 mercury, and 12.2 sulphur); a moderate heat is then applied gradually increasing, and accompanied by suitable stirring of the ingredients till the whole appears to be thoroughly mixed and combined. The black sulphuret of mercury thus formed, is then removed from the boiler and pulverized. In order to convert this into cinnabar, three large earthen subliming pots are placed in a furnace, and gradually brought to a red heat by means of turf: at this time the cover of each (which consists of a simple square plate of iron) is removed, and the contents of an earthen vessel, holding about a pint and a half of æthiops, are poured into each pot. In a few seconds a column of flame rises out of the pots, to the height of five or six feet, and, as soon as it begins to lessen, the further escape of the contents is prevented by putting on the iron cover. In a short time after a second charge is poured in, to which succeeds a third, and so on, till at the end of thirty-four hours the whole of the æthiops has been equally divided between the three pots, making 410lbs. for each. The fire is now kept up as steadily as possible for thirty-six hours longer, in order to accomplish the sublimation, care being taken to stir up the materials at the bottom of the vessels at least once every half hour, by an iron rod made for the purpose and introduced at the top. At the same time the workman ascertains how the process is going on by the flame which appears when the cover is removed; if it rises to the height of two or three feet, the heat is too great, as on the other hand it is too feeble if the flame only lightly quivers about the mouth of the pot; the proper temperature is marked by the flame rising vigorously, yet not exceeding three or four inches in height. When the last thirty-six hours are expired, the furnace is extinguished, and the whole allowed to cool: the subliming pots are then taken out, the iron hoops with which they are bound are knocked off, and the pots themselves are broken; the cinnabar is found sublimed in the upper part of the vessel to the amount of 400lbs. being 10lbs. less than the æthiops that was put in: or, in other words, the loss of weight sustained by the conversion of æthiops into cinnabar, amounts to 2½ *per cent.*

Minium, or red lead, is a calx of lead of a vivid yellowish-red colour, which colour it acquires by a slow calcination and reverberation.

The method in which minium is made in large quantities with us, is concisely described in our article LEAD.

The process by which minium is prepared is described in the following manner by M. Jars. The furnace is of the reverberatory kind, with two fire-places at the ends; each fire-place being separated from the area, or body of the furnace, by a wall twelve inches high. The fire-places are fifteen inches broad, and their length is equal to the breadth of the whole furnace, which is about eight or nine feet. The length of the area from one place to the other is nine or ten feet. The quantity of lead used in one operation is about 1500 pounds, of which nine parts are lead obtained from furnaces where the ore is smelted, and one part is lead extracted from the scoria which is formed in smelting the ore.

This

This latter kind is said to be necessary, as the former could not alone be reduced into powder. All the lead is at once put into the area, the bottom of which is level. The calx, as fast as it is formed, is drawn to one side by means of a rake suspended by a chain before the mouth of the furnace. In four or five hours the whole quantity of the lead is calcined; or, if any pieces remain uncalcined, they are separated and kept for the next operation. The heat employed is that of a cherry-red, and the fire-places and mouth are kept open, that the air may accelerate the calcination. The powder or calx is to be frequently stirred to prevent its concreting, and when this operation has been continued about twenty-four hours, the matter is taken out of the furnace, and laid on a flat pavement. Then cold water is thrown on it, to give it weight, as the workmen say; but rather (as M. Jars thinks) to make it friable. It is then to be ground in a mill, and the finer part is separated by washing, while the coarser part, reserved for some following operation, is to be placed at the mouth of the furnace in order to retain the melted lead. The fine powder, which is now of a yellow colour, is again put into the same or a similar furnace, and exposed to a very moderate fire, from thirty-six to forty-eight hours: during which time it is stirred frequently to prevent its concreting; and the powder gradually acquires its proper red colour. The minium is then to be taken out of the furnace, cooled, and sifted through an iron sieve placed in a cask. Mem. de l'Academie Royale à Paris, 1770. In Holywell, Flintshire, minium is made from litharge, which saves the previous calcination.

A portion of the lead during the operation is lost by volatilization; part of it being dissipated in the air and part settling in the chimnies, and on the roofs of the furnace, in form of a yellowish-white foot, with crystallized lumps intermixed: this is collected from time to time, and either reduced into lead, or mixed with the lead in the subsequent calcination. The quantity of sublimate thus collected cannot be accurately ascertained. Dr. (bishop) Watson, in his "Essays," estimates it at about $\frac{1}{100}$ th of the minium produced. From the circumstances above recited it is not possible to determine the full increase of weight which lead should acquire by its conversion into minium. On an average the actual increase is about $\frac{1}{10}$ th; 20 cwt. of lead producing 22 cwt. of minium.

MINIUM, in the *Materia Medica*, and the *Arts*, &c. For medical purposes it is used externally; it obtunds the acrimony of the humours, allays inflammations, and is excellent in the cleansing and healing of old ulcers: it is used on these occasions in many of the plasters and ointments of the shops; it is an ingredient in the officinal composition, called *emplastrum de minio*, used as a desiccative and cicatrizer; though more rarely than that made in the same manner with litharge, because it does not stick so well, and is more difficult of preparation. See EMPLASTRUM, LEAD, in *Medicine*, and UNGUENT.

It was with minium the ancient Roman and Grecian ladies tinged their nails and faces of a red colour. For, as to our modern paints, without doubt, they were not known in those days.

The bright orange colour of minium might render it valuable in painting, if it could stand with certainty in either oil or water. But as it is subject to become black, it cannot be safely trusted, except in hard varnishes: and is, therefore, seldom used in oil, or even in water, unless for very gross purposes, or as a ground for vermilion. The goodness of the minium may be distinguished by the brightness of its colour: and the adulteration to which it is liable may be detected, by putting an ounce of it into a crucible, with an

equal quantity of charcoal-dust, well mixed together, and placing the crucible in a common fire sufficient to melt lead, which is to be covered with another small crucible inverted into it. When it has been continued for some time on the fire, take it out and strike it against the ground, the minium will thus be reduced to its metallic state; and its diminished weight, when freed from the charcoal-dust and cold, will indicate the proportion of adulterated matter. Minium is also used as a flux in forming the enamel for grounds, and in glazing, &c.

MINNIGAFF, in *Geography*, a town of Scotland, in the county of Kircudbright; 15 miles S.W. of New Gal-loway.

MINNIN, a stringed instrument of music among the ancient Hebrews, having three or four chords to it. Though there is reason to question the antiquity of this instrument; both because it requires a hair-bow, which was a kind of plectrum not known to the ancients, and because it so much resembles the modern viol. Kircher took the figure of this, the *machul chinnor*, and *psaltery*, from an old book in the Vatican library. Hawkin's Hist. Music, vol. i. p. 255.

MINO, in *Geography*, one of the smaller Philippine islands, near the E. coast of the island of Bool. N. lat. $10^{\circ} 6'$. E. long. $124^{\circ} 30'$.

MINOMEIT, a town of Prussia, in Oberland; 13 miles W.N.W. of Heilsberg.

MINONG, or ISLE ROYAL, an island of Canada, in lake Superior, 30 miles long and 10 broad. N. lat. 48° . W. long. 89° .

MINOR, a Latin term, literally denoting *less*, used in opposition to *major*, greater.

Thus we say, St. James Minor, Asia Minor, the minor excommunication, &c.

MINOR *Ædilis*. See *ÆDILE*.

MINOR *Anticus Serratus*. See *SERRATUS*.

MINOR *Barons*. See *BARON*.

MINOR, *Canis*. See *CANIS*.

MINOR *Gastricus*. See *GASTRIC*.

MINOR *Oculi Obliquus*. See *OBLIQUUS*.

MINOR *Orders*. See *ORDERS*.

MINOR, *Rectus*. See *RECTUS*.

MINOR, *Teres*. See *TERES*.

MINOR, *Urfa*. See *URSA*.

MINOR, in *Law*, denotes a person under age, or who, by the laws of the country, is not yet arrived at the power of administering his own affairs, or the possession of his estate.

Among us, a person is a minor till the age of twenty-one; before which time his acts are invalid. See *AGE* and *INFANT*.

It is a maxim in the common law, that in the king there is no minority, and therefore he hath no legal guardian: and his royal assents and grants to acts of parliament are good, though he has not in his natural capacity attained the legal age of twenty-one.

The minority of the kings of Sweden, Denmark, and the provinces of the empire, terminates at eighteen years; and that of the kings of France at fourteen, by an ordinance of Charles V. in 1374.

It is also provided by the custom and law of parliament, that no one shall sit and vote in either house, unless he be twenty-one years of age. This is likewise expressly declared by stat. 7 & 8 Will. III. cap. 25. with regard to the house of commons.

MINOR, in *Logic*, is the second proposition of a formal or regular syllogism, called also the assumption.

MINOR, in *Music*, is applied to certain concords, which differ

differ from, or are lower than, others of the same denomination by a lesser semitone, or four commas.

Thus we say, a third minor, or lesser third: or a fifth major and minor.

Concords that admit of major and minor, *i. e.* greater and less, are said to be imperfect concords.

MINORS, or *Friars Minors*, an appellation which the Franciscans assume, out of show of humility; calling themselves *fratres minores*, *i. e.* lesser brothers; and sometimes Minorites.

There is also an order of regular Minors at Naples, which was established in the year 1588, and confirmed by Sixtus V.

MINORBINO, in *Geography*, a town of Naples, in the province of Bari, the see of a bishop; 85 miles S. of Naples. N. lat. $41^{\circ} 5'$. E. long. $15^{\circ} 59'$.

MINORCA, *INSULA MINOR*, the lesser, when compared with Majorca, and the second of the Balearic isles, an island of the Mediterranean, is long and narrow, forming part of a circle from the S.E. end to the N.W., the hollow part being towards the S. It is thought to be 13 leagues in length at the longest part, and near 38 leagues in circumference: it lies about ten leagues to the N.E. of Majorca, and 50 E. from the mouth of the Ebro. Minorca has successively fallen under the dominion of the Carthaginians, the Romans, the Vandals, the Moors, the Aragonese, and the Castilians; and for a century, from 1708, it has been in the possession of the house of Austria, the English, French, and Spaniards, by turns. This island is situated in the middle of a number of small rocks, banks, and islands; on the south the shore is level. The air is moist, and the soil dry. The administration is divided into districts, or terminos, the chief towns of which are Ciudadella, Mahon, Alayor, Ferarias, and Mercadal. The principal ports are Mahon, on the E.; Fornella, on the N.; and Ciudadella, on the W. The isle is level, and there is only one mountain distinguished by its elevation, *viz.* Monte Toro. Ciudadella, or Samna, the capital, is situated at a small distance from the coast, towards the N.W., 11 leagues from Mahon; it was in the fifth century the see of a bishop, and the residence of the governor of the island, and also the seat of civil and ecclesiastical jurisdiction. In the time of the Carthaginians and Romans it was a considerable place; but its splendour has declined; and port Mahon disputed with it the superiority, when the English established their tribunals and seat of government in the island. (See *PORT MAHON*.) The port is small and marshy, formed by a canal, bounded by rocks. On the right and left are towers, corresponding to each other, to repeat the signals, and two cannons of a large calibre, upon swivels, sufficient to stop a privateer. The entrance is difficult of access. The city is surrounded in part with ancient walls, erected by the Moors; the rest is modern, formed of bastions and curtains of hewn stone. The streets are of ancient form, being narrow and shady, paved with large unhewn stones; and in the city are a cathedral, flanked by a beautiful square tower, and supposed to be built in the third century, two churches, three convents, and an hospital. The termino, of which Ciudadella is the capital, bearing its name, is above $5\frac{1}{2}$ leagues long, and $2\frac{3}{4}$ wide; and its total population amounts to about 800 persons. Alayor is situated about $4\frac{1}{2}$ leagues from Mahon, being the chief town of the termino of that name, containing about 112 hamlets or manors, and rather more than 4000 people. The streets are uneven, narrow, crooked, and ill paved: but the houses are well built. At the entrance into the town is a church, built of free stone, in a simple Gothic style of architecture without, and within decorated with sculptures and

paintings. The monastery of Cordeliers has a handsome church. Here are also an hospital, and a barrack capable of accommodating 250 men. The town is well provided with cisterns, and the water is fresh and salubrious. About one league from Alayor is *Mercadal*; which see. The most remarkable ports of this island, besides those of Mahon and Ciudadella, are Fornella and Adaya. Port Fornella is about six miles from mount Toro, of a circular form, with a narrow entrance, and facing the north. The bay is capable of containing the largest fleet, perfectly sheltered, and defended at the entrance by a small square fort, with bastions and fosses. The establishment is capable of containing 300 men. The entrance to the port of Adaya is concealed by eminences towards the north; it is only used for fishing. The strength of the island depends upon circumstances. When the English retook it, in 1798, the Spaniards had in it 6000 troops, and the English, exclusive of their naval force, disembarked only 3000 soldiers. When the Spaniards, four years after, were reinstated, they left a garrison with 3000 infantry, 1500 light infantry, 500 engineers and miners, and 90 heavy cavalry.

Of the islands, or islets, surrounding Minorca, the most considerable are to the S., about $\frac{2}{3}$ of a mile from Cabo Bufara. The island of Coloms is elevated, and forms with the cape a narrow canal. Near it are two small islets. The large and small islands of Adaya are near the port of the same name. To the S.E. is situated the large island of Aguida. The isle of Sanitge is near the port of the same name on the W. coast; at some distance is an islet, and beyond that the island of Bleda. Beyond the rocks of Alayor, are a small island named Galera, and an islet called Codrell. The isle of Layre de Mahon is within reach of the ancient fort of St. Philip, and there are several small islands near Mahon.

Monte Toro is at a little distance from Mercadal, and by its elevation commands the whole island: at its base it is some miles in circumference, and its form is that of the frustum of a cone. Mount St. Agatha is situated N.W. of Mercadal, and rises above several mountains that surround it. Upon the summit is a chapel, held in great veneration. The whole of this canton is inhabited by shepherds, whose flocks subsist upon a part of the mountains, and the valley beneath is abundantly fertile.

Minorca is not sheltered from the north winds, which check vegetation; nevertheless snow is seldom seen here in winter, and in the spring the air is always temperate and pure; the heat of summer is great, and the drought is productive of inconvenience. In the autumn there is much rain. The soil of the plains is less fertile than that of the coast; and the earth upon the mountains, though thinly spread over the rocks, is rich and fertile. In the vallies and plain, the soil is argillaceous and thin, but it is fertilized with that which is washed down from the mountains. Upon the whole, this island is, in many parts of it, rich in vegetation. The principal grains cultivated in the island are wheat, barley, and a small quantity of maize. Red and white wines are exported; olive trees are numerous, and here is abundance of every kind of fruit, such as oranges, pomegranates, lemons, figs, &c; and the island furnishes great variety of garden and culinary vegetables. The water-melons are very fine; and the honey of the island, some of which is exported, is reckoned very good. The horses, mules, and asses, are estimated at about 2000; the horned cattle at 7000; the sheep, goats, and small animals, at about 45,000; the pigs at nearly 10,000. Poultry is scarce, but birds of different species are very numerous. The fish all round the island is abundant at all seasons, and very good. The inhabitants have

have no manufacture or fabric for furnishing articles of exchange in commerce. Their export trade consists of a small quantity of cheese sent into Italy, and a small surplus of wool, which produce about 2500 *l.* sterling; salt, wine, honey, and wax produce from about 17,083 *l.* to 17,921 *l.* The island receives from abroad corn, brandy, rice, sugar, coffee, tobacco, spices, linen, fine cloths, boards, pitch, cordage, &c. and some pieces of furniture. The natural history of this island presents to us a natural and very interesting grotto, called La Cava Perella, two miles to the S. of Ciudadella; and also a subterranean lake; a quantity of coral is found near the sea-shore, and a small variety of shells. In many parts of the island are mines of iron and lead, and quarries of stone and marble. The inhabitants are a quiet, peaceable people, attached to their own customs, and little disposed to change. They regard with reverence the ceremonies of religion. The same language is spoken in Minorca and Majorca. In this island, and particularly in the territory of Añazor, they have some altars of ancient date. It has also furnished Phœnician, Macedonian, Carthaginian, Celtiberian, Grecian, Roman and Spanish medals, in gold, silver, and large and small bronze. In this island, also, a small Gothic bronze coin has been discovered, the impression on which is a crowned head in the centre of a circle, with these words, "Alphonfus Rex;" supposed to belong to the end of the 13th century. The island also has presented to the antiquarian ancient sepulchres, vases, lamps, urns, lacrymatories, composed of a reddish earth, and marked with illegible inscriptions. N. lat. 39° 59'. E. long. 3° 45'.

MINOREA, *Cape*, a cape on the E. coast of Majorca. N. lat. 39° 50'. E. long. 3° 12'.

MINORE, Ital., the same as *minor*, Engl.

MINORESSES. See *St. CLARE*.

MINORI, in *Geography*, a town of Naples, in Principato Citra, the see of a bishop, suffragan of Amalfi, near the sea; three miles N.E. of Amalfi. N. lat. 40° 37'. E. long. 14° 26'.

MINOS, a small island near the coast of South Carolina. N. lat. 33° 48'. W. long. 78° 38'.

MINOS, *Is.*, a town on the N. coast of Masbate, one of the Philippine islands. N. lat. 12° 33'. E. long. 123° 10'.

MINOS, in *Mythology*, one of the three judges of hell, of rank superior to the other two, *viz.* Æacus, who, according to Plato, judged the Europeans; and Rhadamanthus, who, having left Crete, and fixed his residence in Asia, had the Asiatics and Africans for his lot; and Minos, as chief president of the infernal court, decided the differences that arose between the two other judges. All the poets are agreed in assigning to him the superiority over his colleagues. Homer represents him as sitting with a sceptre in his hand, in the midst of the ghosts of departed mortals, who plead their respective causes in his presence. Virg. *Æn.* vi. v. 432, places an urn by him, containing the several lots of mankind; while the stern Rhadamanthus sees to the execution of the sentences which his brother pronounces. The particular district of Aides, over which he was supposed to preside, was Erebus; and it was his office to determine the character and final condition of the spirits cited to his tribunal. Minos, it is said, was the first king of Crete, and considered as the wisest legislator of antiquity; on which account he obtained the honour of being judge in the invisible world. This Minos, whose institutes are said to have served as a model for those of Lycurgus, flourished, according to Selden, and others, who refer for authority to the Arundelian marbles, 1462 years, but, according to the abbé Banier, only 1340 years before Christ.

Minos, with a view of giving greater authority to his laws, retired into a cave at Crete, where he feigned that Jupiter, his father, dictated them to him, and every time he returned from the cave he announced some new law. Hence, Homer (*Olyss.* 19.) gives him the title of Jupiter's disciple, Διὸς μύθηος ἀκούων, which is thus expressed by Horace (*Olyss.* 10.), "Et Jovis arvens Minos admissus." Josephus is the only ancient writer, who says that Minos had received his laws from Apollo, and that he had travelled to Delphi to receive them from that god. (Lib. ii. against Appian.) This Jewish writer owns, that Minos was the only one among the ancients who deserved to be compared to Moses. If we give credit to Hæstius, Minos was the same with Moses, and he alleges that they lived about the same time. But the opinion of the learned prelate is contradicted by the decisive testimony of all antiquity; nor is the parallel which he has ingeniously drawn between these eminent lawgivers sufficient to convince impartial and candid inquirers. Banier allows, that some confused knowledge of the laws of Moses furnished Minos with a model for those of Crete.

Minos, after having governed his subjects with a mild and gentle sway, died in Crete, and being interred there, had this epitaph inscribed upon his tomb, ΜΙΝΟΣ ΤΟΥ ΔΙΟΥ ΤΑΦΟΣ; Minos F. Jovis Sepulchrum; when in process of time the name of Minos was defaced, and there remained only the two last words of the epitaph, the Cretans gave out that this was the tomb of Jupiter. This inscription, it is said, was defaced by the malice of the Cretans, who boasted of possessing the tomb of the father of the gods, whom they pretended to have brought up in his infancy. Accordingly, Callimachus, in a hymn addressed to Jupiter, sharply reproaches them on this account; for he says thus to the following purpose: "The Cretans are always liars, since they vaunt that they have thy tomb, O great king, who livest for ever!" To this passage the apostle alludes, when he upbraids the same people in the words of Callimachus, with the vice of lying.

MINOTAUR, MINOTAURUS, in *Antiquity*, a fabulous monster, much talked of by the poets; feigned to be half man and half bull.

The minotaur was brought forth by Pasiphae, wife of Minos II., king of Crete. It was shut up in the labyrinth of that island; and at last was killed by Theseus.

The fable of the minotaur was invented by the Greeks to make Minos odious. The occasion was this. Minos, having laid siege to Athens, reduced the inhabitants to great distress; when, consulting an oracle, they were directed to supplicate peace of Minos, the king of Crete. This he granted to them on condition that every ninth year, according to Plutarch and Ovid, or every seventh year, according to Diodorus Siculus and Apollodorus, the Athenians should send to him seven youths, and as many virgins. This article being agreed to, Minos raised the siege and withdrew to Crete, carrying with him those who were chosen by lot to be the first victims to the preservation of their country. Hence the fable originates. The Greeks said, that the king of Crete condemned the Athenian youths, who were sent to him, to fight in the labyrinth which Dædalus had built, with the minotaur, that was the offspring of the infamous passion of Pasiphae, his queen, for a white bull which Neptune had produced from the sea; that Dædalus, who was obliged to leave Athens, and remove to Crete, had favoured that monstrous passion of the queen; that from the conjunction sprung the minotaur. It was, without doubt, the hatred of the Greeks against Minos that made them invent this fable; for Plato says, that

that the favourable character which Homer and Hesiod had given of this great prince was of no avail against the malice of his enemies; and Plutarch adds, that it is dangerous to provoke a knowing people, who have it always in their power to take revenge. Servius gives us the following explanation of this fable. He says, that a secretary of king Minos, named Taurus, *bull*, had an intrigue with the queen Pasiphae, in the chamber of Dædalus; and that she was at length delivered of twins, one of which resembled Minos, and the other Taurus. This occasioned the production to be reputed monstrous.

In order to account for that part of the fable, that ascribes the destruction of the minotaur to Theseus, we observe, that this young hero, having obtained his father's permission, prepared with the other youths, who had cast lots, to set out for Crete. After the performance of certain rites, Theseus set sail, and with a favourable wind speedily arrived at Crete. His fine address attracted the notice of Ariadne, Minos's daughter (see the article *ARIADNE*), who gave him a clue, which he happily made use of to find his way out of the labyrinth, after vanquishing the minotaur: that is, Ariadne taught her lover to vanquish Taurus, furnishing him with arms; and by the clue we may understand the draught and plan of the labyrinth which the princess gave him, and of which he made use to find his way thence after the encounter. Some indeed have said, that Theseus encountered Taurus, not in the labyrinth, but in a public place; and that this young hero, animated by the presence of the fair Ariadne, defeated Taurus, an event which gave great joy to all, even to Minos himself, who thus got rid of a formidable rival. Our author says, that the son of Pasiphae and Taurus making great desolation in the mountains to which Minos had confined him, this prince sent all the Athenian slaves to combat with him; and Theseus having gone thither in his turn, put him to death with the sword which his mistress Ariadne had given him.

MINOVERY, formed of the French *main-œuvre*, *q. d.* *handy-work*, a trespass committed in the forest, by something that is a man's handy-work; as an engine to catch deer, &c.

MINOW, or **MINIM**, in *Ichthyology*, a name given by the English to the small fish, called by authors the *poxinus*. See *CYPRINUS Poxinus*.

MINROW, in *Geography*, a town of Hindoostan, in the Doob; 50 miles W. of Paltiar.

MINSFELDEN, or **MUNZFULDEN**, a town of Germany, with a citadel; 25 miles E. of Coblenz.

MINSK, a town of Russian Lithuania, and capital of a palatinate of the same name, situated on the Swilocz; 250 miles N.E. of Warsaw. N. lat. 53° 43'. E. long. 27° 40'.

MINSTER, a town of Lower Bavaria; seven miles N.E. of Brannau.

MINSTER, *Saxon*, *Mynster*, or *Mynstre*, anciently signified the church of a monastery or convent.

MINSTREL, an ancient term for a fiddler, or player on any other kind of musical instrument.

Borel derives the word from *manus* and *histrion*, one who diverts with the hand; or from *minor histrion*, *little buffoon*: Du-Cange from *ministrillus*, a diminutive of *minister*, because the minstrels were anciently ranked among the lower officers, ministers, or servants.

According to Dr. Percy, in his *Essay on the Ancient English Minstrels*, the word is derived from the French *menestrier*; and was not in use here before the Norman conquest: and it is remarkable, that our old monkish his-

torians do not use the words *cytharæodæus*, *cantator*, or the like, to express a minstrel in Latin; but either *minus*, *histrion*, *joculator*, or some other word that implies gesture. Hence it should seem that the minstrels set off their singing by mimicry or action; or, according to Dr. Brown's hypothesis, united the powers of melody, poem, and dance. These minstrels were probably the genuine successors of the ancient bards, who joined the arts of poetry and music, and sung verses to the harp of their own composing. After the conversion of the Saxons to Christianity, the poets and minstrels became two separate professions: and the latter continued to be a distinct order of men, and got their livelihood by singing verses to the harp at the houses of the great: where they were hospitably and respectfully received, retaining many of the honours shewn to their predecessors, the Bards and Scalds. And though some of them only recited the compositions of others, many of them still composed songs themselves, and all of them could probably invent a few stanzas on occasion.

Mr. Ritson, in his Introduction to "Ancient English Metrical Romances," blends the English minstrels with the jugglers, whose tricks of legerdemain formed another branch of the amusement of our ancestors. Although it be allowed, that the same person might occasionally practise both arts, yet we see no reason for doubting, that they were separate and distinct professions; nor can we admit the supposition of Mr. Ritson, that the minstrels, whose profession was music and the recitation of poetry, were not frequently themselves poets. Their daily bread depended upon their stock of tales and songs; and it must have been as natural for them to have composed the romances which they sung, as for a modern musician to compose the pieces which he performs. Above all, we cannot see why the arts of composition, which are admitted to have been exercised by the minstrels of France, should be supposed unattainable by those of England. Subsequent to the reign of Edward III., most of the popular French romances were translated into English, which then became the language, as well of the nobles as of the vulgar. Why the minstrels, who were most interested in these translations, should be deemed unequal to the task of accomplishing them, we can see no good reason for believing. As a wandering and idle race of men, attendant on the barons who went to war in France, they had time to acquire both languages; and the art of rhyming must have been easy to persons who almost every day of their lives were employed in poetical recitation. Minstrels and bards are often employed as synonymous terms, although the poetic powers of the bards are indisputable. As late as the reign of queen Elizabeth, this combination occurs in the poem of a Scottish satirist describing London.

"Bot yet the menstrallis and the bairdis,
Thair trowand to obtain rewardis,
About his ludgene loudlie played."

Legend of the bishop of St. Androis.

A proof how far the task of the poet and of the reciter were required from the minstrel, occurs in a very ancient poem, of which there is one MS. in the British Museum, and another in the library of Peterborough cathedral. It contains the history of an intrigue betwixt Thomas of Erceldoune, called the Rhymer, and the queen of fairies, by whom, as every one knows, he was transported to the "Lond of Faerie," and gifted with those supernatural powers of poetry and prophecy, by which he was afterwards distinguished. The following dialogue passes be-

twixt the hard and his faery leman upon this memorable occasion.

“ Fare wel Thomas, I wend my way,
I may no longer stande with the —
Gif me sum tokyn, lady gaye,
That I may say I spake with the. —

To harp and carpe, Thomas, wher so ever ze gon,
Thomas, take the these with the. —

Harping, he said, ken I non,
For tong is cheife of mynstralcie. —

If thu wil spelle, or talyz telle,
Thomas thu shal never make lye ;
Wher so ever thu goo, to sayth or felle,
I pray thu speke never non ille of me.”

From this decisive declaration, which a poet and minstrel made on the nature of his own profession, it appears plainly, that, in more ancient times, the minstrel's principal and most honourable occupation referred to poetry, rather than music; and the Rhymer might have been justly described as one “who united the arts of poetry and music, and sung verses to the harp, of his own composing,” if he had not disdained the musical skill to which it was Mr. Ritson's persuasion that the talents of the minstrel were exclusively limited. See Edinb. Rev. No. XIV. p. 304, &c.

Mr. Ellis, in the Introduction to his “Specimens of early English Metrical Romances,” has given us a plain and comprehensive view of the rise and progress of the minstrels and their poetry. Of his account we shall avail ourselves in the compilation of this article.

Normandy appears to have been the cradle of minstrelsy. The Northmen who wrested that province from the feeble successors of Charlemagne, had, doubtless, like all other barbarous people, especially the Scandinavian tribes, their national poets, under the name of scalds, or by whatever other term they were distinguished. On their settling in Neustria, their native speech speedily melted down into the more commodious and extended language used by the inhabitants of Northern France, which was called *romance*, being, in fact, a corrupted Latin, introduced by the Romans into their Gallic province. In this language, the minstrels composed most of their works, until, from that circumstance, the word *romance*, from signifying the early Norman-French, came at length to mean those chivalrous tales usually composed in that tongue.

“It appears likely,” says Mr. Ellis, “that they were carried by Rollo into France, where they probably introduced a certain number of their native traditions; those, for instance, relating to Ogier le Dancis, and other northern heroes, who were afterwards enlisted into the tales of chivalry; but that, being deprived of the mythology of their original religion, and cramped, perhaps, as well by the sober spirit of Christianity, as by the imperfection of a language whose tameness was utterly inapplicable to the sublime obscurity of their native poetry, they were obliged to adopt various modes of amusing, and to unite the talents of the mimic and the juggler, as a compensation for the defects of the musician and poet. Their musical skill, however, if we may judge from the number of their instruments, of which very formidable catalogues are to be found in every description of a royal festival, may not have been contemptible; and their poetry, even though confined to short compositions, was not likely to be void of interest to their hearers, while employed on the topics of flattery or satire. Their rewards were certainly, in some cases, enormous, and prove the esteem in which they were held; though this may be partly ascribed

to the general thirst after amusement, and the difficulty experienced by the great in dissipating the tediousness of life; so that the gift of three parishes of Gloucestershire, assigned by William the Conqueror for the support of his *joeculator*, may, perhaps, be a less accurate measure of the minstrel's accomplishments, than of the monarch's power and of the insipidity of his court.

“To the talents already enumerated, the minstrels added, soon after the birth of French literature, the important occupation of the *décor*, or *déclaimer*. Perhaps, the declamation of metrical compositions might have required, during their first state of imperfection, some kind of chast, and even the assistance of some musical instruments, to supply the deficiencies of the measure; perhaps, the aids of gesture and pantomime may have been necessary to relieve the monotony of a long recitation: but at all events it is evident, that an author who wrote for the public at large, during the eleventh, twelfth, and thirteenth centuries, was not less dependent for his success on the minstrels, than a modern writer of tragedy or comedy on the players of the present day. A copyist might multiply manuscripts for the supply of convent-libraries; but while ecclesiastics alone were able to read, there was no access to the ears of a military nobility, without the intervention of a body of men who travelled in every direction, and were every where welcomed as the promoters of mirth and conviviality.

“The next step was easy. Being compelled to a frequent exercise of their talent in extemporaneous composition, the minstrels were probably, like the *improvvisatori* of Italy, at least equal, if not superior, to more learned writers, in the merely mechanical parts of poetry; they were also better judges of the public taste. By the progress of translation they became the depositaries of nearly all the knowledge of the age, which was committed to their memory: it was natural, therefore, that they should form a variety of new combinations from the numerous materials in their possession; and it will be shewn hereafter, that many of our most popular romances were most probably brought by their efforts to the state in which we now see them. This was the most splendid era of their history, and seems to have comprehended the latter part of the twelfth, and perhaps the whole of the thirteenth century. After that time, from the general progress of instruction, the number of readers began to increase; and the metrical romances were insensibly supplanted by romances in prose, whose monotony neither required nor could derive much assistance from the art of declamation. The visits of the minstrels had been only periodical, and generally confined to the great festivals of the year; but the resources, such as they were, of the ponderous prose legend were always accessible. Thus began the decline of a body of men, whose complete degradation seems to have been the subsequent result of their own vices. During the period of their success they had most impudently abused the credulity of the public; but it is a whimsical fact, that the same fables which were discredited while in verse, were again, on their transfusion into prose, received without suspicion. It should seem that falsehood is generally safe from detection, when concealed under a sufficient cloak of dulness.”

This history solves a difficulty which Mr. Ritson, already cited, found in reconciling the degraded state of the minstrels to the high rewards and countenance which they sometimes received, even in preference to those of the clerical profession. It appears, on one occasion, that two mendicant friars soliciting hospitality at the gate of a convent, were received with acclamation under the idea of their being minstrels, and kicked out again when they announced their

real character. It is also proved, we believe, that one minstrel received four shillings for his performance, and six priests only sixpence, at the same festival. But such instances of extravagant reward to individuals of a class which dedicates personal exertions to public amusement, are consistent with the general disrespect to which this body in general is condemned.

There are two remarkable facts in history, which prove that the profession of a minstrel was held in great reverence among the Saxon tribes, as well as among their Danish brethren. In the year 878, when king Alfred wished to learn the true situation of the Danish army, which had invaded his realm, he assumed the dress and character of a minstrel, *singens se joeuatorem, assumpta ciithara*, &c. and under this character, though he could not but be known to be a Saxon, obtained an honourable reception. About sixty years after, a Danish king made use of the same disguise to explore the camp of our king Athelstan. The minstrel was, therefore, a privileged character with both these people: and so late as the reign of Edward II. the minstrels were easily admitted into the royal presence; an instance of which is mentioned by Stow (Survey of Lond. 1703, p. 469.) In the fourth year of Richard II. John of Gaunt erected at Tutbury, in Staffordshire, a court of minstrels, with full power to receive suit and service from the men of this profession within five neighbouring counties, to enact laws and determine their controversies, &c. for which they had a charter. See Plott's Hist. Staff. p. 435, &c.

The minstrels continued down to the reign of Elizabeth; in whose time, however, they had lost much of their dignity, and were sinking into contempt and neglect; yet still they sustained a character far superior to any thing we can conceive at present of old ballads. Towards the end of the sixteenth century this class of men lost all credit, and were sunk so low in the public opinion, that in the thirty-ninth year of Elizabeth, a statute was passed by which minstrels, wandering abroad, were included among rogues, vagabonds, and sturdy beggars, and were adjudged to be punished as such. This act seems to have put an end to the profession, for after this time they are no longer mentioned. Judge Blackstone observes, that in some manors, the copyholders were bound to perform many servile offices for the lord, who found them meat and drink, and sometimes (as is still the use in the Highlands of Scotland) a minstrel or piper for their diversion. Comm. b. ii.

The first compositions of the minstrels, according to Mr. Ellis (ubi supra), seem to have been unadorned annals or histories, reduced to measure for the convenience of the reciter, who was to retain them upon his memory. This field, however, soon became too barren and uninteresting. Other sources of narration were sought for. Some occurred in the ancient songs of the scalds, the legitimate productions of the minstrels. Others of Arabian origin found their way to France through Spain. But a much more numerous class was derived from the tales of the Armoricans, the neighbours of the Normans, who derived themselves from a Welsh colony. From this source, the minstrels probably drew their first accounts of

“ ————— What refounds
In fable or romance, of Uther's son,
Begirt with British and Armoric knights.”

This theme, however, acquired its chief popularity after the acquisition of England by William the Conqueror. It is now completely proved, that the earliest and best French romances were composed for the meridian of the English court, where that language continued to be exclusively used,

at least till the time of Edward III. When the Norman race of monarchs had once secured themselves on the throne of England, and identified the honour of that country with their own, they began to feel an interest in its early history, and to listen with applause to the feats of its heroes. The legends of the Welsh, on these occasions, were much more acceptable than those of the Saxons. The latter were the people whom the Normans had conquered, and whose kings they had dispossessed: the praise, therefore, of their departed heroes revived sentiments of discord, better forgotten by all parties. But the exploits of the British were carried back to so ancient a period, and so intermingled with Celtic fable, that they recalled no sentiments of ancient independence, and suggested no ideas dangerous to the Norman race. The exploits of Arthur were therefore unanimously adopted as the subject of tales and romances without end; and these were drawn by the Norman minstrels from the British traditions flowing from Wales, and floating in what had lately been the British kingdom of Cumberland; but especially from the works of Geoffrey of Monmouth.

Mr. Ellis shews, that the state of Wales, during the eleventh, twelfth, and thirteenth centuries, was favourable to an exchange of literary materials betwixt the bards of that country and the Norman minstrels, as well as between the former and their brethren of Armorica.

But as there is reason to believe that the British lays were seldom if ever committed to writing, it might be expected that different minstrels would tell the same story with some variations; that, unable to retain in their memory the whole of a long narrative, they would carry off, in the first instance, detached adventures, which they would afterwards connect as well as they were able; and that a system of traditional history, thus imperfectly preserved through the medium of a very loose translation, and already involved in much geographical and chronological confusion, would assume the fabulous appearance which we find in the French narratives called romances. See ROMANCE.

MINT, the place in which the king's money is coined. Anciently there were mints in almost every county in England; but as it is one of the prerogatives of the king to coin the money of the realm, the business of coining was carried on principally in the Tower of London, from the time of William the Conqueror to the year 1811. At this latter period a very elegant building was completed on the eastern side of Tower-hill, in which the coinage is now performed with a simplicity, dispatch, and accuracy that can scarcely be conceived by any who have not been witnesses of the several operations.

Coining metallic money was originally performed by the hammer, and afterwards by what was called the screw-press, or mill and screw. These operations have been amply described under the word COINAGE, to which we beg to refer our readers. In this place we shall endeavour, in very few words, to conduct them through the several offices of the New Mint, and describe, as well as we can, the business and processes carried on in each.

Almost all the money, now coined in this kingdom, is from bullion received from the Bank of England; from which it is sent to the “master of the mint's assay-office:” here it is received into what is called the strong-hold, and there kept till its fineness is ascertained, in order that its true value may be computed.

This being ascertained, the parties concerned are desired to attend at the office of receipt and delivery to witness its weight, and to be informed of its fineness, and, consequently, of its value; the standard weight of the bullion being determined by the calculation of the respective offices.

A mint-

A mint-bill is now made out and given to the owner of the bullion, by which he knows the exact value of his deposit. The next thing is to deliver the bullion to the melting-house, which is furnished with a variety of apparatus, adapted, not only to the melting of the gold and silver, but the lifting in and out the pots containing the precious metals, with safety, ease, and expedition. The silver is melted in pots of cast-iron, but the gold is melted in smaller pots manufactured from black-lead, which, according to the modern chemistry, is a carburet of iron. The silver is run into plates ten inches long, seven wide, and about five-eighths of an inch thick: the gold-plates are ten inches in length, four in breadth, and three-eighths of an inch in thickness. While the metal is pouring into the moulds, there are three portions taken, from the top, the middle, and bottom of each pot, and carried to the king's assay-office, there to be examined by the maffer of that office, and not permitted to pass into work until the fineness of the metal is accurately determined. The furnaces used are air-furnaces, and the fuel is coke.

In the process of melting there will necessarily be waste: every thing, therefore, that can possibly contain any portion of the precious metals, such as the sweepings of the melting-house, &c. are collected and carried to another apartment, in which are erected two grinding and two triturating mills, where the sweep is worked up, and the fine metals in part recovered, in the manner practised by refiners and gold-smiths.

The sweep, thus brought together, is ground into a powder, and passed through a fine sieve, by which the larger grains of metal are obtained. The sweep is then put, in small portions, into a wooden bowl, having two iron handles, by which it is carefully washed: the lighter particles, being absorbed by the water, are collected in a large tub; the heavy or metallic ones are found deposited at the bottom of the bowl. By these means the most considerable of the particles of gold and silver are obtained. The powdered sweepings, however, which have been collected after the washing process, still contain portions of metal; to obtain these, the sweep, in certain portions, is put into a mill, containing generally about one hundred weight of mercury, the remainder of the mill being filled with water: this is commonly called the triturating mill, and each charge is agitated about four hours with an iron instrument, having four arms placed horizontally, in the shape of a cross, and fixed to the centre of the mill; and for the better agitation of the sweep and mercury, the motion of this mill can be reversed at pleasure.

From the melting-house, the plates above described, provided they are found by the assay-maffer to be of the exact degree of fineness, are carried to the *ROLLING-Mill*, (which see.) They are first hot-rolled, that is, made red-hot, in a furnace adapted to the purpose, and then passed through a pair of cast-iron rollers. In the room in which this operation is performed there are four pair of rollers, which (as they require an immense power) are put in motion by a steam-engine, of a power equal to that of thirty horses. The rollers are placed very near the furnaces, and the metal, being brought to what is called a blood-red heat, is taken out by a man with a pair of smith's tongs, and immediately returned by another man, and again passed through while hot two or three times, by which it is greatly extended: after this, it is annealed. See *NEALING*.

This process is called the breaking-down rolling, and when finished the plates of silver are about $\frac{3}{16}$ ths of an inch thick. They are then cut into slips by a pair of circular shears attached to the shafts, by which the rollers are worked,

after which they are finished in what are called the adjusting-rollers, which are also made of cast-iron, and very finely polished. In this process the slips are rolled cold, and when a piece cut from the middle of each is found of the proper standard weight, they are carried to another apartment, called the cutting-out room, containing twelve machines worked by a steam-engine of the power of sixteen horses. With these machines the blank pieces are cut out from the slips or lamine just mentioned with great ease and velocity. The only manual labour required, is that performed by a boy nine or ten years old at each machine; he quickly learns the art of presenting the lamine to the cutters, which instantly cut out the blank pieces of metal; these so struck fall through a hole that conducts to a box placed below to receive them. Each machine will cut 60 pieces in a minute, of course the twelve will produce 720 in a minute, or 43,200 in an hour. Formerly these machines were worked by hand by a man or boy at each cutter, but no manual labour can operate so accurately and well as the power obtained by the steam-engine. The instruments with which the blanks are cut (called a bed and punch), are made of steel, of the exact diameter of the piece of money required.

From this apartment the blanks are carried to the adjusting-room, where every piece is most accurately weighed, the gold twice, at least, and the silver once: those pieces that are found too heavy are reduced by the file, called a float, and those that are found too light, which occasionally occurs, are re-melted.

The blanks, now properly adjusted, are carried to the milling-room. Into this, the writer of the present article was not allowed to enter; the process of milling being a secret by the very constitution of the mint. This has always been the case since the time of Peter Blondeau, who introduced the milling in 1662, as appears from an extract from Mr. Folkes, in his "Tables of English Silver Coins," in which he observes, and the observation holds good even now, though at the distance of sixty-five years; that "it may be noted that this practice of keeping secret the manner of edging the money, is still observed in our mint, all those who are entrusted with it being sworn not to discover it: notwithstanding, the manner in which the same operation is performed in several foreign mints, is there publicly shewn."

The blanks, when milled, are annealed, or softened, in order that they may be fitted to receive the impression.

The next operations are pickling and cleaning. The process of pickling is to throw the pieces of gold, thus annealed, into a strong solution of super-sulphat of alumine, those of silver into a solution of the super-sulphat of potash.

When the pieces are properly blanched, they are taken into another room to be dried and cleaned, which operation is performed by agitation in sieves, containing saw-dust, over a gentle heat.

They are now taken to what is properly called the coining-room. In this apartment there are eight coining-presses worked by a ten horse-power steam-engine; the apartment also is, in the winter months, heated with steam, so as to be kept to an uniform temperature. The machines are worked with the most perfect accuracy, and with such rapidity, that each will produce about 60 in a minute; and on the average, allowing for the necessary delays in working forty pieces of money, that is 320 guineas, &c. will pass through the eight machines in a minute, or about 19,200 in an hour. These machines require also one boy of ten or twelve years of age to each, who, by supplying the machine with the planchets, runs no risk of injury to his fingers, as the machine contains in itself a self-feeder or layer-on; the busi-

ness of the boy being only to fill the layer-on, through a tube with the blanks. From this tube, the machine places the blanks upon the dye, and when struck, displaces one piece and replaces another, and so on as long as the steam-engine is kept at work. The coin thus completed is carried to the mint-office, where the king's assayer attends, and where the process called *Pixing*, (which see,) takes place, to ascertain the weight and fineness of the monies before delivery.

The two faces of the coin are struck at once, the upper and under dye being both engraved for the purpose. The dyes are the workmanship of some capital engraver; he, of course, makes the pattern upon soft steel: from this, many others are taken at an office in the mint, and hardened, as is described under the article *CASE-HARDENING*. The engraver is called upon to verify the accuracy of the dyes made use of, with the pattern or mould which he has finished.

In the time of Charles II., when the English coins were brought to great perfection, John Roetier, a native of Antwerp, and Thomas Simon, were engravers to the mint. They were both called upon to make models or pattern pieces of money, to be exhibited at court; his majesty is said to have given the preference to those by Roetier, which were ordered to be followed in the punches or dyes to be made for the new money. "Which preference," says Mr. Folkes, "so far exasperated Simon, who did not value his performances less than they deserved, nor knew how to submit to a foreign rival; that he thereupon immediately quitted the mint, or, for some apprehended misbehaviour upon the occasion, was soon after removed from the office of one of the chief engravers."

It was in the year 1663, that he produced that inimitable crown, with the petition round the edge, that is now valued by the curious as a master-piece in this sort of workmanship. It resembles what were the common milled five shilling pieces, but the king's head is larger; the face and the garment are covered with a sort of frosted work. The letters are expressed by outlines frosted in the middle, and under the head is the name of Simon: upon the reverse there is a centre, instead of the usual star, the figure of St. George on horseback, encircled with the garter. The date is 1663, and upon the edge is the artist's petition, *viz.* "Thomas Simon most humbly prays your majesty, to compare this his trial-piece with the Dutch, and if more truly drawn and embossed, more gracefully ordered, and more accurately engraven, to relieve him." It is said, there were not more than twenty of these pieces struck off with the petition, and a small number without. We have seen one of the twenty in possession of the Rev. Dr. Disney, from the collection of the late Mr. J. Hollis; it is in the highest state of preservation: and in the memoirs of Mr. Hollis is a fine engraving of the medal, a little magnified. It is not ascertained what relief Simon obtained upon this petition, but it is pretty clear he was never afterwards employed in the mint.

MINT, Officers of the, are, 1. The warden, who is the chief, and is to receive the bullion, and oversee all the other officers. This officer has under him a deputy and two clerks. 2. The master-worker, with three clerks; he receives the bullion from the warden, causes it to be melted, and delivered to the moniers; and takes it from them again when coined. 3. Comptroller, with a deputy and clerk, who is to see that the money be made to the just assize, and to oversee the officers. 4. The assay-master, who weighs the silver and gold, and sees whether it be

standard. (See *REMEDY*.) This officer, called the king's assay-master, has under him a clerk. 5. The master's assay-master, and the probationer assayer. 6. The surveyor of the melting, who is to see the silver cast out, and that it be not altered after it is delivered to the melter, *i. e.* after the assay-master has made a trial of it. 7. The clerk of the irons, who is to see that the irons be clean, and fit to work with. These two offices are united in one person, who has a deputy and clerk. 8. The chief engraver, who engraves the dyes and stamps for the coinage of money: there is also an assistant engraver, and a probationer engraver, with a smith, assistant to the engravers. 9. The melters, who melt the bullion before it comes to coining. 10. The blanchers, who anneal, or boil and cleanse the money. 11. The porter and office-keeper, who keep the gate, &c. of the mint. 12. The provost to the company of moniers, acting as engineer, who provides for all the moniers, and oversees them. And, lastly, the company of moniers; some of whom shear the money, some forge it, some stamp or coin it, and some round and mill it. In this office, there are also the weigher and teller; receiver; king's clerk, and clerk of the paper; surveyor of the money-presses; solicitor and assistant; warden's deputy, master's deputy, comptroller's deputy, and subordinate clerks. See *COINAGE*, and the preceding article.

MINT, Roman, has been justly regarded as one of the most essential ornaments and sinews of the state. It derived great importance from the extent of the empire through which its produce was to circulate. The "*Quæstor*" seems at first to have had the direction of the mint, as well as of the treasury. About the time of the first coinage of silver in Rome, or 266 years B. C., the "*Triumviri Monetales*" seem to have been created; though Pomponius ascribes their first creation to the year of Rome 463, or 289 B. C. These were at first of the senatorial rank, until Augustus appointed them from the equestrian, which alteration seems to have continued. The title "*Triumviri*," however, remained till after Caracalla, as appears from inscriptions given us by Gruter, and by Bouteroc. Under Aurelian, it is probable there was but one master of the Roman mint, called the "*Rationalis*;" a change suspected by Pinkerton to have taken place under Gallienus. Aurelian, having conquered the revolted provinces, and united the whole empire again, seems to have altered the form of the mints in the capital provincial cities, and to have ordered them all to strike money with Latin legends, and of the same forms; for with him first appear coins on this plan with mint-marks of cities and offices. He seems also to have permitted the provincial cities to strike gold and silver as at Rome: and we know from his coins that the "*Aureus*," which had diminished by degrees to about 80 grains, was by him restored to 100. On this occasion, the moniers, who lost half their profits, and three-fourths of whom lost their work, caused commotions, which terminated in a rebellion, the suppression of which was attended, on the part of Aurelian, with the loss of 7000 of his best troops. About this time, the "*Procurator Monetæ*" seems to have succeeded the "*Rationalis*." In the Roman colonies, the direction of the mint appears to have been committed to the "*Duumviri*," or two annual magistrates, elected in imitation of the consuls at Rome. The engraving of the dye was a work of labour and of genius; and at Rome Greek artists were usually employed in it. The engravers of the dye were called "*Cælatores*:" other officers employed in the mint were the assayers of the metal, "*Speçtatores*," "*Expectatores*," or "*Nummularii*." The refiners were denominated "*Cenarii*;"

narii;" the melters "Fufarii," "Flaturarii," "Flaturarii." The "Equatores Monetarum" adjusted the weight. The "Suppolltores" put the pieces in the dye, and the "Mallectores" struck it. A "Primitivus" was at the head of each office; and there was a foreman, called "Optio et Exactor." Pukerton's *Ess. on Med.* vol. i.

MINT was also a pretended place of privilege in Southwark, near the king's bench, put down by statute. If any persons, within the limits of the mint, shall obstruct any officer in the serving of any writ or process, &c. or assault any person therein, so as to receive any bodily hurt, the offender shall be guilty of felony, and be transported to the plantations, &c. Stat. 9 Geo. I.

MINT, in *Botany*, &c. See MENTHA.

MINT, *Corymbiferous*, a name given by some to a species of tansy.

MINT, *Cat's*, the English name of a genus of plants, called by botanical writers *catarris*. See CATMINT.

MINTERS, or MONEERS. See MONEVERS and MINT.

MINTING is sometimes used for the coining of money.

MINTON, in *Geography*, an island in the Indian sea, near the W. coast of the island of Sumatra, a little S. of the line. E. long. 97° 8'.

MINTURNÆ, in *Ancient Geography*, a town of Italy, in Latium, upon the Appian way, near Formie on the W., and Sueffa Arunca on the E. situated on the Liris, at some distance from its mouth. Livy speaks of it as a very ancient city. The Romans gained possession of it by treason, in the year of Rome 439, and planted a colony in it. But the event which rendered it particularly memorable, was the imprisonment of Marius in this town, and his escape, in consequence of striking terror into the mind of the soldier who was sent to assassinate him. See MARIUS.

MINUARTIA, in *Botany*, so called by Læfing in commemoration of a Spanish botanist of the name of Minuart, an apothecary at Madrid, with whom Læfing was acquainted while in Spain, and from whom he received many botanical observations; as appears by various passages in his letters published by Linnæus.—Læf. It. 48. Linn. Gen. 42. Schreb. 58. Willd. Sp. Pl. v. 1. 492. Mart. Mill. Dict. v. 3. Ant. Hort. Kew. ed. 2. v. 1. 184. Juss. 300. Lamarck Illust. t. 52.—Class and order, *Triandria Trigynia*. Nat. Ord. *Caryophyllæ*, Linn. and Juss.

Gen. Ch. *Cal.* Perianth inferior, erect, long, compressed, of five, awl-shaped, rather stiff, permanent leaves. *Cor.* none. Nectary composed of a few depressed glands within the calyx. *Stam.* Filaments three, capillary, short, inserted into the receptacle; anthers roundish. *Pist.* Germen superior, triangular; styles three, short, thread-shaped; stigmas thickish. *Peric.* Capsule oblong, triangular, a little shorter than the calyx, of one cell and three valves. *Seeds* not numerous, roundish, compressed.

Obs. *Minuartia montana* is said occasionally to be found with traces of five minute petals, which are possibly what Læfing described as nectariferous glands.

Ess. Ch. Calyx of five leaves. Corolla none. Capsule with one cell and three valves. Seeds few.

1. *M. dichotoma*. Linn. Sp. Pl. 132. Læf. It. t. 1. f. 3.—Leaves bristle-shaped. Stem simple, erect. Flowers sessile, crowded together in a forked manner.—Very plentiful on the hills about Madrid.—This little annual scarcely exceeds an inch in height. The stem is simple, erect, rarely branched, dichotomous at the upper part. Leaves opposite, awl or bristle-shaped, erect, so close as to cover the whole stem. Flowers sessile, cymose, forming a little square head, closely forked. Bractæas long, awl-shaped, rigid, twice or

thrice as long as the flower. Seeds from five to eight, kidney-shaped. The whole plant assumes a brownish-herbaceous colour.

2. *M. montana*. Linn. Sp. Pl. 132. Læf. It. t. 1. f. 4.—Flowers crowded, lateral, alternate, shorter than the bractæa.—Found in wet sandy situations on the sides of hills about Madrid.—Root annual, fibrous, very small. Stem simple, scarcely an inch in height, jointed, smooth. Leaves opposite erect, bristle-shaped, broader at the base, striated, acute, rigid. Flowers sessile, about three together, rarely solitary. Seeds from three to seven, small.

3. *M. campestris*. Linn. Sp. Pl. 132. Læf. It. 122.—Flowers crowded, terminal, alternate, shorter than the bractæa.—Found in situations similar to the two last species.—Root annual, very slender and simple, somewhat twisted. Stem quite simple, and very short, covered with leaves, round. Leaves opposite, flat, awl-shaped, striated, rigid, close to the stem, numerous. Flowers terminal, forming a compact little head, partially forked, but not universally so, and in this respect the plant chiefly differs from *M. dichotoma*. Seeds five or six, compressed, kidney-shaped.—The whole plant has a sealy or husky aspect.

MINUCCIO D'AREZZO, in *Biography*, according to Boccaccio, an exquisite singer and player on the viol, in great favour with Peter of Roan, king of Sicily.

MINUET, or MENUET, in *Music*, a composition answering to a kind of dance of the same name, said to be invented at Poitou; the motion of which is triple, with three crotchets in a bar $\frac{3}{4}$, though it is commonly performed in the time $\frac{4}{4}$. It has commonly two strains, each played twice over; the first has four or eight bars, the last note of which should be either the dominant or mediant of the mode, never the final; and the second has eight bars, it usually ends on the final of the mode, with a pointed minim or whole bar.

The word is said to be derived from the French *menu*, little, and signifying a small pace.

It seems as if the air and dance of that name, in such high favour and use during the last century in all the courts of Europe, as well as that of France, whence it was adopted, was either unknown to Broffard, or its character must have been very much changed since his time. In his *Dict. de Mus.* he defines *minuetto*, or *menuet*, *Danse fort gaye*, a very lively dance. But so far from lively and gay was this dance, that its characteristics were grace and gravity. It has been even said to be the only grave dance since the disuse of the *louvre*, fit for persons of high rank and dignity to dance alone at courts or great balls. But as the country-dance, at the latter end of the last century, was supplanted by the cotillon, the cotillon by the waltz, the instrumental minuet by the jig, the dance itself of the slow minuet is wholly abolished. For a further account, see MENUET.

MINUETTO *per Ballo*, Ital. a dancing minuet.

MINURI, in *Geography*, a town of Naples, in Principato Citra; 9 miles S.W. of Salerno.

MINUS, in *Algebra*. See CHARACTERS, in *Arithmetic*.

MINUS Quo, in *Law*. See QUO MIMUS.

MINUSCULÆ, in *Printing*, denote the small and running letters; as contradistinguished from *majuscule*, or capitals.

MINUTE, from the Latin *minutus*, small, in *Geography* and *Astronomy*, is the sixtieth part of a degree.

In which sense minute is also called *prime*, or *prime-minute*.

The divisions of degrees are fractions, whose denominators increase in a sexagesimal ratio; that is, a minute or prime is $\frac{1}{60}$ th; a second, or second minute, $\frac{1}{3600}$ th, &c.

In astronomical tables, &c. minutes are expressed by acute accents, thus, ' ; the seconds by two, " ; the thirds by three, "".

MINUTE, in *Computation of Time*, is used for the sixtieth part of an hour.

MINUTE, in *Architecture*, usually denotes the sixtieth, sometimes only the thirtieth, part or division, of a module.

MINUTE is also used to signify a short memoir, or sketch of any thing hastily taken in writing.

In this sense we say, the minutes of the proceedings of the house of lords, &c.

MINUTES of *Emerson*. See EMERSON.

MINUTES, *Meridional*. See MERIDIONAL.

MINUTE *Tithes*, *Minores Decime*, small tithes of wool, lambs, pigs, butter, cheese, &c. See TITHE.

MINUTIUS, FELIX, MARCUS, in *Biography*, an able apologist for Christianity in the third century, probably a native of Africa, who flourished towards the close of the reign of the emperor Septimius Severus, or about the year 210. He was educated to the profession of the law, and became an eminent pleader at Rome; where he renounced the heathen religion, and embraced that of Christ. He was author of an excellent defence of Christianity, entitled "Octavius," written in the form of a dialogue, between a heathen and a Christian, in which Minutius himself sits as judge and moderator. By this contrivance, he replies to the objections and arguments brought forward by the adversary, and refutes the calumnies cast upon Christians by the heathen philosophers, and at the same time exposes the absurdities of their creed and worship, powerfully demonstrating the reasonableness and excellence of the Christian religion. This work was, for a considerable time, attributed to Arnobius; but in the year 1560, Francis Baldwin, a learned lawyer, published it at Heidelberg, and made the discovery, in a preliminary dissertation, that Minutius was its true author. It has, since that time, gone through many editions, of which the best is that printed at Cambridge in 1712, with the dissertation of Baldwin prefixed, and "Commodiani Instructiones adversus Gentium Deos," added in the way of appendix. Gen. Biog. Lardner.

MINUZIANO, ALESSANDRO, a learned printer in the 15th century, was born at St. Severo, in Puglia. After studying under George Merula at Milan, he succeeded him as professor of rhetoric, and held that chair, with the professorship of history, several years. He interested himself very much in the editing of the learned works that issued from his press, and at length established a printing-press of his own. The first specimen that he gave was a fine edition of all Cicero's works, in four vols. folio. After this, he published editions of various authors, ancient and modern, to many of which he prefixed learned prefaces, written in an elegant style. He was a diligent collator of old manuscripts, and took vast pains to establish the most authenticated readings. He was not free from the unfair practice, at that period but too common among printers, of pirating each other's works: and when Leo X. caused the "Annales" of Tacitus to be printed for the first time at Rome, he found means, by bribing some of the workmen employed upon it, to obtain the sheets as they were worked, and brought out a rival edition. On account of this he incurred the pope's displeasure, and involved himself in troubles from which he was scarcely able to extricate himself.

MINX, in *Zoology*, is the name of an animal in North America, very much resembling the otter. See MUSTELA *Vison*.

MINYA, in *Ancient Geography*, a town of Greece, in Thessaly, called also "Almonia."—Also, a town of Asia,

in Phrygia.—Also, a town of the island Amorgos, situated in the most western part of the island.

MINYÆ, MINYANS, an ancient people of Greece, who were dispersed through different countries. The most ancient people of this name were settled in Bœotia, and the inhabitants of Orchomené are said to have derived it from Minyas, one of their kings. Some of these Minyans conducted a colony to Iolcos, and hence the Argonauts have been sometimes denominated Minyans. Others of them joined themselves to a colony which the sons of Codrus conducted to Ionia; and they established themselves, under the direction of Athamas, at Theos, a town situated to the south of the isthmus which connects the peninsula with the continent, W. of Smyrna. Others of them, tracing their derivation from the Argonauts, settled in the isle of Lemnos, whence they were driven by the Pelasgians. These fugitives failed to Laconia, and having encamped on mount Taygetus, the Lacedæmonians gave them land, and they intermarried with the Lacedæmonians. Of these Minyans, some in process of time aspired to the government, and rebelled against the powers that enforced the existing laws; and they were arrested, thrown into prison, and threatened with death. But their wives, having obtained permission to visit them in prison at the time when they were to be executed, changed clothes with them, and thus afforded them the means of rescue. They then retired to mount Taygetus, where they must have perished, if Theras, of the race of Cadmus, had not obtained their pardon.

MIOGA, in *Botany*, the Japanese name of a plant of the natural order of *Scitamineæ*, called by Kämpfer *Djooka*, vulgarly *Mjoga*, *Miougua*, or *Megga*, *Amœn*. Exot. 826. (*Anomum* Mioga; Thunb. Jap. 14. Kämpf. Ic. t. 1. Willd. Sp. Pl. v. 1. 7. *Zingiber* Mioga; Roscoe Tr. of Linn. Soc. v. 8. 348.)—Kämpfer describes it as "one of the eatable kinds of Ginger, of a mild taste, with a reedy stem and leaves, resembling those of wild Ginger (*Zingiber Zerumbet* of Roscoe). Its flowering bulb grows from the root near the stem, at the surface of the ground. The flowers are produced in succession, each proceeding from between scales, hooded, two inches long, of a pale colour, resembling the flowers of Ginger, with a faint smell of *Petasites*, or *Butter-bur*."

This curious plant was sent to Kew garden in 1796, by the right hon. sir Joseph Banks, but has not yet flowered. By Kämpfer's plate the flower-stalk appears remarkably short for a *Zingiber*, and more resembling a true *Anomum*, but there is no essential difference. The coincidences between the characters of the flowers, and the qualities of the roots, in these several species, confirm the solidity of Mr. Roscoe's arrangement, which is one of the happiest efforts that have been made in scientific botany. See SCITAMINEÆ.

MIOKECK, in *Geography*, a town of Sweden, in West Gothland; 36 miles S.E. of Gotheborg.

MIOLENS, a town of France, in the department of Mont Blanc, at the conflux of the Arche and Isere; 10 miles E. of Chambéry.—Also, a town and fortress of France, in the department of the Lower Alps; 9 miles W. of Barcelonetta.

MIOLLON, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 4'. E. long. 18° 20'.

MIONI KIALLE, a town of Persia, in the province of Mazanderan; 42 miles S. of Fehrabat.

MIOSS, a lake of Norway, in the government of Aggerhuus, about 50 miles long from N. to S., and from 2 to 16 broad, containing one island, 8 miles in circuit: the southern extremity is 30 miles N.E. of Christiania.

MIOUPOILON, a small island in the Indian sea, near the coast of Africa.

MIPARTY, *Chamber of*. See **CHAMBER**.

MIPROVEITZ, in *Geography*, a town of Bulgaria, the see of a Greek archbishop; 52 miles N.W. of Sophia.

MIQUELIPS, a kind of foot soldiers, inhabiting the Peruvian mountains: armed with pistols under their belts, a carbine, and a dagger. The miquelips are dangerous people for travellers to meet.

MIQUELON, in *Geography*, a small island in the Atlantic ocean, eight miles S.W. of Cape May, in Newfoundland. It is not more than three fourths of a league in length, and its soil is indifferent. It was ceded to the French by the peace of Paris in 1763. The English destroyed the settlement in 1778, and kept the island till the year 1783, when it was restored by the peace; and in 1793 it was retaken by the English, and restored at the peace of Amiens. N. lat. 46° 30'. W. long. 50° 5'.

MIR, a town of Lachuania, in the palatinate of Novogrodek; 24 miles S.E. of Novogrodek.

Miu N'fir, a town of Persia, in the province of Adirbeizan; 30 miles W.N.W. of U-mia.

MIRA, a town of Italy; 10 miles E.N.E. of Padua; eight miles W. of Venice.—Also, a town of Moldavia; 44 miles S.W. of Burlat.—Also, a town of South America, in the province of Chocos; 50 miles N. of Zitara.—Also, a town of Portugal, in the province of Beira; 16 miles N.W. of Coimbra.—Also, a river of Para, which runs into the Pacific ocean, N. lat. 1° 40'.

MIRABAT, or **MIRBAT**, a town of Arabia, in the province of Oman; 200 miles S.W. of Mascat.

MIRABAUD, **JOHN BAPTIST**, in *Biography*, a man of letters, was descended from a family of Provence, and born at Paris in 1675. He was intended, in early life, for the military profession, and was present at several battles. After this he became a member of the congregation of the Oratory, to which society he continued warmly attached through the remainder of his life. Having spent many years in literary pursuits he engaged in the service of the house of Orleans, and was entrusted with the education of two young princesses of that family. As an author he was first known by his translation of Tasso's "Jerusalem Delivered." This work gave him an entrance into the French academy in the year 1726, though not without some murmurs from original writers, who did not scruple to say that the patronage of the house of Orleans had more contributed to procure him this distinction, than his merit as an author. He next translated the "Orlando Furioso," which was also favourably received by the public. In 1742 he was elected perpetual secretary of the French academy, on the acceptance of which post, he insisted upon renouncing the right to a double fee of attendance, which his predecessors had enjoyed. In return for this disinterestedness, the academy procured for him an apartment in the Louvre, and a pension was attached to the secretaryship. Having occupied the place for several years, he resigned it to Duclos, who, however, insisted upon Mirabaud's retaining the pension and apartment in the Louvre, where he died, with perfect tranquillity, in 1760, at the age of 86. He was of a mild and equal temper, and a true philosopher in his conduct and sentiments. He had composed various works on interesting topics of literature, history, and philosophy; to the "Système de la Nature," published in 1770, his name is prefixed, but it is now generally believed that he was not the author.

MIRABEAU, **VICTOR RIQUETTI**, marquis of, a French political writer, and one of the leaders of the sect of Economists, was born of an ancient family of Provence. His

first literary work, entitled "L'Ami des Hommes," published in 1755, in three volumes, contains many useful ideas on rural and political economy, and displays liberal and judicious views of the great interests of society. It obtained to much public approbation and celebrity, that the name of the work became an epithet of the author, who is distinguished as "Mirabeau l'ami des hommes." He afterwards wrote in favour of provincial administrations, and published "Théorie de l'impôt:" all his writings are said to breathe a spirit of improvement and reform, which, together with his strictures on the financiers, was so little agreeable to the court, that he was for a short time imprisoned in the Bastille. He is variously represented, according to the different notions and feelings of the persons who have spoken of him and his works. He died in 1790, at the commencement of the revolution, after he had shewn an attachment to the court, while his son was a most distinguished leader among the popular party. All his writings were published collectively in eight volumes 12mo., with the exception of one, entitled "Hommes à célébrer," in two volumes 8vo., which he sent in manuscript to his friend, father Boscovich, by whom it was printed at Bassano.

MIRABEAU, **HONORE-GABRIEL RIQUETTI**, count of, son of the preceding, was born in 1749. The impetuosity of his temper led him to disdain the ordinary pursuits of youth, though it has been thought that a contempt for these pursuits was the principal cause of his want of application, for when Locke on the "Human Understanding," was put into his hands, he sat down to the perusal of it with the closest attention, and after making some progress in it, exclaimed "This is the book I wanted." While he was still a stripling he exhibited an ungovernable and daring spirit, with a propensity to almost every irregularity. Between him and his father there was the most irreconcilable difference, so that the marquis, who has been charged by La Harpe with tyranny in his family, obtained a lettre de cachet against his son, then only seventeen years old, and had him closely confined in the isle of Rhè for two years. On his liberation he procured a commission in the regiment of dragoons, with which he served a year in Corsica. On his return to France he precipitated himself into every extravagance, and became involved in great difficulties. He married a young lady of family and great fortune, but his father contributed, on the occasion, nothing more than his consent to this union, and his dissipations soon brought him into new difficulties. His conduct towards his wife was brutal, and his irregularities became so excessive and notorious that he was several times imprisoned, and once, on account of his seducing a lady, the wife of the marquis de Monnier, he was committed to the castle of Vincennes, where he was confined nearly four years. These imprisonments, by checking his career of dissipation, tended to improve and strengthen his mind, as he found in them no employment so interesting as laying in stores of information and reflection, and acquiring the habit of composition. At Vincennes he became an author, and published an abridgment of French grammar, and some licentious productions. These were followed by his celebrated "Essai sur les Lettres de Cachet, et les Prisons d'Etat," in which he pleaded for the right of every citizen to personal liberty, until he had been deprived of it by a legal trial, with all the energy and eloquence of one who had been a sufferer under uncontrolled authority. He next commenced an action against his father for maintenance and arrears, in which he was successful. With the assistance of Chamfort, a man of letters of some celebrity, he composed a work entitled "Considérations sur l'Ordre de Cincinnatus," the subject of which was a projected society in the United States of North America, which the friends of republicanism looked

looked upon with jealousy. During its composition, he frequently consulted Dr. Franklin, then at Paris. He now became a writer by profession, and with a view to his maintenance went to London, where he published some volumes of a work called "Le Conservateur," in which an analysis was given of the most valuable current publications. In London he met with very small encouragement, and returned to Paris, where he wrote some tracts on public finance. In 1786 he went to Berlin, to observe the politics of the court, and was admitted into the presence of, and had a conversation with, Frederic the Great, who was then attacked with his last illness. From his observations he wrote two very free and important letters of advice, or memorials, to the next king on his accession. He probably had some views to employment in the new reign, but his hopes were frustrated by his licentious character, and his open profession of atheism. He chiefly occupied his time at Berlin, with laying in materials for his statistical account of the Prussian and Saxon states, and for his secret and satirical history of the court of Prussia; he became a member of the society of *Illuminati*, and published an "Essay on the sect of *Illuminées*," which appearing to disclose its secrets, is thought to mix with them so many absurd fictions as to involve the whole in ridicule.

Upon the assembling of the Notables he returned to Paris, and by the freedom of some of his remarks, in a pamphlet against stock-jobbing, an order was issued for his apprehension, which he fortunately evaded by a temporary concealment near Liege. He did not continue long there, but on his return to the metropolis ingratiated himself with the minister Brienne, by writing against Neckar. In 1787 he visited Berlin, and was employed, in conjunction with his friend Mauvillon, in preparing for the press the work entitled "Histoire de la Monarchie Prussienne," which was published in the following year, in four volumes 4to. and in eight of the 8vo. size, and obtained for the author a high reputation for political and satirical knowledge. In 1789 appeared "Histoire Secrete de la Cour de Berlin," in which the reigning king of Prussia, and several other great personages in his court, were treated with so much disrespect, that the work was ordered, by the parliament of Paris, to be burnt by the common hangman.

The assembling of the States-General excited in Mirabeau's mind the highest expectations, and he, without doubt, viewed the approaching troubles of the kingdom as pregnant with events, in which his abilities would lead him to take a very conspicuous part. At the time of the elections he went to Provence, with the hope of being chosen one of the deputies of the noblesse for that province, but being rejected as not possessing any property in it, he opened a grocer's shop at Aix, put on an apron, sold his wares, and rendered himself so popular, that he was elected, with the greatest acclamations, a deputy of the tiers état of that city. On the meeting of the states, he set up a daily paper, which he entitled "Lettres de Mirabeau à ses Commettans," which gave such an account of the debates as might serve the interests of the popular party. Some feeble attempts were made to crush it, but without any effect, and its circulation became very extensive. He soon distinguished himself as the most eloquent speaker, and took a leading part in those disputes between the different orders, which ended in the assumption of the character of "National Assembly" by the tiers-état. It was on this occasion that a declaration was issued by the assembly, which among other subjects observed, that "the denomination of 'National Assembly' is the only one befitting the assembly in the actual situation of affairs, because the members composing it are the only representatives lawfully and publicly acknowledged and verified; be-

cause they are sent by almost the whole nation, and because the Representation being one and indivisible, none of the Deputies chosen, in whatever order or class, has a right to exercise his functions separately from the present Assembly." On another occasion, after a royal sitting, as it was called, the deputies were ordered by the king to depart, and the order was repeated by M. de Brèze, grand-master of the ceremonies. Mirabeau rose, and addressing Brèze in authoritative language, bid him go and acquaint those who sent him, that they were assembled by the will of the people, and that nothing but the bayonet should separate them. This speech confirmed the tiers-état in their resistance to the royal authority, and Mirabeau followed it by proposing and carrying a decree, declaring the inviolability of the persons of the members. About this time he attached himself to the duke of Orleans, but finding that prince incapable of carrying into effect any great designs, he withdrew from his councils. The death of his father in 1790 was of no advantage to his fortune, on account of the embarrassment in which he left his affairs, yet he found means to pay off large debts, and to live in a splendid style, which was generally attributed to the donations of the duke of Orleans. His motions were sometimes of a popular kind, sometimes tending to the support of authority. Though apparently a friend to order, he was thought secretly to have been the instigator of the worst outrages committed by the mob, over whom he possessed a greater influence than any other individual. In the infancy of the Jacobin club he was a constant attendant upon its meetings, but when the members seemed desirous of over-setting the whole system, he deserted and opposed them. In May 1790 he was the warm advocate for the right of peace and war as inherent in the executive power; from this period it was generally said that he had sold himself to the court, and his popularity was for some time much impaired. He had however enough of art and management to recover his influence, though he still treated the Jacobins with great contempt. It is imagined that he was engaged in a plan to procure the dissolution of the national assembly, and the liberty of the king, by means of an appeal to the nation, when he was attacked by a violent disease which proved fatal. The danger of no individual ever excited so universal an alarm; all Paris, as it were, crowded round his door, with eager enquiries, and the king himself sent messages to learn the state of his health. He died April 2d, 1791, at the age of 42. The honours paid to his memory were almost unprecedented. All public spectacles were suspended till his funeral, which was attended by all the ministers and deputies, and a vast number of other persons, to the Pantheon, where his body was deposited by the side of that of Descartes. His bust was placed in the halls of most of the municipalities of the kingdom, and funeral services were performed for him in several of the provincial capitals. Such, however, were the mutations of the public mind, that in the very next year, when republicanism was triumphant, his busts were destroyed, and his remains dissipated. Besides the works already mentioned, he published a variety of pamphlets. In his person, Mirabeau was gross and repulsive; in his manners, passionate and brutal. He was the most splendid figure in the earlier scenes of the French revolution, but, like a meteor, he dazzled and disappeared without leaving any lasting traces of his existence. No man of the time was perhaps equally qualified to shine in political warfare. Possessed of great eloquence, he was capable of bearing all before him in popular debate, and of a presence of mind which no emergency could disconcert; accustomed to lead the opinions of the public, and deriving more popularity from the boldness of his writings, than he lost by the dissoluteness of his morals, he was perfectly fitted

to act on the tumultuary theatre of revolutionary politics. His want of principle must exclude him from the rank of a real patriot, yet he was probably, on conviction, a friend to those public rights upon which all just and enlightened government is founded. Gen. Biog. Rabaut's Hist. of the French Revolution.

MIRABEL, in *Geography*, a province of Crete or Candia, lying to the E. of that of Candia, is populous, fertile, and abounding with oil, grain, and fruit. Formerly this province supplied several French vessels with oil, and thus kept up its price for the benefit of the inhabitants; but they have since been obliged to carry it, at a great expence, to Candia, and to sell it at a low price to the Turkish proprietors of the soap houses established in that town. In consequence of this reduction of price, the cultivation of olive trees, and the manufacture of oil, have declined. The road of Mirabel faces the east, and affords to vessels a tolerably safe anchorage. It is sheltered and defended by two small islands situated in front. The town is greatly diminished since commerce has taken another direction. Here are still reckoned 1500 inhabitants, most of whom are Greeks and cultivators. South of Mirabel lies the province of "Hierapetra," or "Gera-Petra," which produces, like the other province, oil, grain, various fruits, honey, wax, flax, &c. but it suffers equally with Mirabel from the prohibition, issued by the pacha, of selling commodities any where but at Candia. Olivier.

MIRABEL, a town of France, in the department of the Lot; nine miles N. of Montauban.

MIRABELLE, a town of Naples, in the county of Molise; 14 miles S.E. of Molise.—Also, a town of Naples, in Principato Ultra; 10 miles S.E. of Benevento.—Also, a town of Sicily, in the valley of Noto; four miles N.E. of Piazza.

MIRABILE, RETE. See RETE.

MIRABILIS, in *Botany*, a name which originated with the Spaniards, who applied to the beautiful plant, which still bears this name, the appellation of *Marabillas del Peru*, the Wonder, or Marvel, of Peru, on account of the great diversity of colour in its flowers, even on the same root. At first, as professor Martyn observes, every thing that came from the new continent was thought wonderful. The French call the plant of which we are speaking *Belle de nuit*, because the flowers expand, and smell sweet, at night only. Indeed the botanists of that nation seem to have taken a violent dislike to the original name, and all that belongs to it. Tournefort called this genus *Jalapa*, which is founded in error; and Jussieu *Nyctago*, derived from the French idea. The latter is unexceptionable, but superfluous.—Linn. Gen. 96. Schreb. 114. Willd. Sp. Pl. v. 1. 999. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 382. Stokes Mat. Med. v. 1. 311. Lamarek Illustr. t. 105. Gært. t. 127. (Nyctago; Juss. 90. Jalapa; Tourn. Init. 129. t. 50.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Aggregatz*, Linn. *Nyctaginez*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five erect, rather deep, unequal segments, permanent. *Cor.* of one petal, funnel-shaped; tube slender, long, gradually dilated upwards, its base permanent, hardened, investing the seed; limb somewhat spreading, plaited, in five slight equal segments. Nectary spherical, fleshy, surrounding the germen, obscurely five-toothed at the margin. *Stam.* Filaments five, inserted into the edge of the nectary, attached to the tube of the corolla, thread-shaped, inclining, unequal, extending rather beyond the tube; anthers roundish, ascending; pollen glutinous. *Pistl.* Germen turbinate, superior, within the nectary; style thread-shaped, the length and position of the

filaments; stigma globose, rough, ascending. *Peru.* none, except the permanent hardened base of the corolla. *Seed* solitary, ovate, obscurely five-sided.

Ess. Ch. Calyx inferior, five-cleft. Corolla funnel-shaped, its base inflated and permanent. Nectary a gland surrounding the germen. Seed solitary, coated.

1. *M. dichotoma*. Forked Marvel of Peru. Linn. Sp. Pl. 252. (Jalapa officinarum; Mart. Decad. 1. t. 1.)—Flowers nearly sessile, axillary, solitary, erect. Native of Mexico, from whence its seeds were brought very early to Europe. The plant is naturally perennial, having a thick oblong fleshy root; but if raised on a hot-bed, it will flower and feed the same season, like the usual race of tender annuals. It kept in a green-house, or planted in the open air close to the wall of a hot-house, it will endure many years, and flower more abundantly throughout the summer. The stem is herbaceous, succulent, very bushy, forked, knotty at the joints, three feet high, round, smooth except a narrow hairy line at the two opposite sides. Leaves opposite, stalked, ovate, somewhat heart-shaped, pointed, entire, very slightly downy or hairy at the margin and ribs. Flowers from the forks of the stem, on very short stalks, sweet-scented, of a scarlet red; their tube one and a half inch long. Calyx bell-shaped, a quarter of an inch in length.—This plant was by some botanists mistaken for the Jalap of the shops, which is now known to be a *Convolvulus*, and has blossomed this season, 1812, in the garden of A. B. Lambert, esq. at Boyton, Wilts; a rare occurrence in Europe, since the plant was sent over by Houston, 80 years ago.

2. *M. Jalapa*. Striped Marvel of Peru. Linn. Sp. Pl. 252. Curt. Mag. t. 371. (Admirabilis peruana, rubro flore; Clus. Hist. v. 2. 89. Mirabilia peruviana, flore luteo; Ger. em. 343.)—Flowers crowded, stalked, erect. Leaves nearly smooth.—Native of the East and West Indies. Very closely related to the foregoing, except that the calyx is longer, and the flowers more crowded together, on longer stalks. The leaves are not quite smooth at the edges. The corolla varies remarkably in colour, on which account, as well as its fragrance in the evening, the plant is highly desirable. What is said above of the treatment of *M. dichotoma*, is equally applicable to this. Some flowers are of a uniform scarlet red, others striped or speckled with red and white, in endless variety, on the same plant. On some they are all of an uniform very delicate yellow; while other individuals bear parti-coloured red and yellow blossoms. Most botanists, and among them Linnaeus, have believed this to be the real officinal Jalap; a mistake to which we have already alluded. See also CONVULVULUS, sp. 90, *Jalapa*.

3. *M. longiflora*. Long-flowered Marvel of Peru. Linn. Sp. Pl. 252. Stockh. Transf. for 1755. 176. t. 6. Sm. Exot. Bot. v. 1. 43. t. 23. (Atzoyatl, Mirabili Mexicana; Hernandez. Mex. 170.)—Flowers crowded, terminal, sessile, very long, slightly drooping. Leaves downy.—Native of the more cool and mountainous parts of Mexico, flowering in September. The seeds of this elegant species were sent by the French astronomers, about the middle of the last century, from South America, to M. le Monnier at Paris, by whose liberality they were dispersed throughout Europe. The plant has ever since been preserved, either as a tender annual, or the roots taken up, and kept from year to year in sand, they being, like those of the two former, truly perennial, and very large, externally black. The stem is three or four feet high, round, repeatedly forked, downy. Leaves opposite, heart-shaped, entire, soft, downy, and viscid, foetid when bruised; the lower ones stalked; the rest sessile. Flowers sessile, many together at the leafy top of each branch. Calyx very clammy and foetid. Corolla four inches long.

long, with a downy green and purplish tube; limb white, with a purple eye. *Antbers* orange. *Stigma* large, hairy, of a rich purple. *Seed* with a curiously tessellated dark brown coat, as big as the kernel of a filbert.

The flowers are highly scented. A few of them gathered in an evening, when they expand, without the foetid calyx, and placed in a glass of water, will perfume a large apartment all night. We do not however recommend them for a bed-chamber, or any close room. Each flower lasts only one night, but there is a copious succession till the close of autumn.

MIRABILIS, in *Gardening*, furnishes plants of the flowery perennial kind, of which the species cultivated are, the common marvel of Peru (*M. jalapa*); the forked marvel of Peru (*M. dichotoma*); and the sweet-scented marvel of Peru (*M. longiflora*).

The first sort has several varieties in the colour of the flowers, as purple and white, and variegated purple and yellow, but which resolve themselves into two principal varieties; as with purple and white flowers, which are variable; some being plain purple, others plain white, but most of them variegated with the two colours, and all found occasionally on the same plant; and with red and yellow flowers, generally mixed, but sometimes distinct on the same plant; some plants having only plain flowers, others only variegated; but the plants which are raised from seeds of the purple and white never produce red and yellow flowers, or the contrary.

All these varieties are highly ornamental during the months of July, August, and September, and, when the season continues mild, often last till near the end of October. The flowers opening only towards the evening, while the weather continues warm, but in moderate cool weather, when the sun is obscured, they continue open almost the whole day, and are produced so plentifully at the ends of the branches, that when expanded the plant seems entirely covered with them, and from some being plain, others variegated on the same plant, have a fine appearance.

The second species is common in the West Indies, where it is termed the *Four-o'clock flower*, from the circumstance of the flowers opening at that time of the day.

Method of Culture.—In all these sorts the propagation is effected by sowing the seed in the spring season, either on a warm border or on a hot-bed; but the latter method produces the plants considerably more early, and in the greatest perfection. When cultivated on warm south borders, in the places where the plants are to remain, the seed should be sown about the middle of April, either in patches or in shallow drills, half an inch deep, and six inches asunder: and when the places can be covered with hand-glasses, or a frame and lights, or the seed be sown in pots under those protections, or any other occasional shelter during the night time or in cold weather, it will greatly forward the germination of the seed, as well as the growth of the young plants afterwards. In the latter mode about June, the plants will be fit to plant out into the borders or into pots. Moist weather should be chosen for this purpose, and water and occasional shade be given till well rooted: they then readily grow, and acquire a tolerable size; but they do not attain to a large size, or flower so early by a month or six weeks as those forwarded in the hot-bed.

But in the latter method of raising them, a hot-bed should be prepared in March, or early in April, under frame and lights, and earthed over about six inches deep, then sowing the seed in the earth of the bed in shallow drills half an inch deep, as directed above, or in pots of rich earth the same depth, plunging them in the earth of the bed. The latter is the better method. The plants soon rise; when they should have fresh air daily, in common with the other plants of the bed,

and frequent refreshings of water; and when nearly two inches high, be planted out into another fresh hot-bed to forward them, placing them either in the earth of the bed, four or five inches asunder, or singly in small pots (thirty-two), plunging them in the bed; water and shade should be immediately given till fresh rooted, continuing the care of admitting fresh air every mild day; and about the middle or latter end of May, when they have acquired a good size and strength, they should be inured by degrees to the full air, so as that they may be removed into it fully about the beginning of June, choosing mild cloudy moist weather, if possible, for the business; taking up such as grow in the beds with balls of earth about their roots, and planting them in the borders; but those in the pots may be turned out with the whole ball entire, and planted in that way. Some should also be removed into large pots for moving into particular situations. Water should be directly given, and occasional shade to such as require it, repeating the waterings to the whole, till they have struck fresh root and begun to grow, when they will not require any further culture, except the occasional support of sticks, which is most necessary in the last sort.

As the seed ripens well, it will frequently prevent the trouble of preserving the roots. But when these are taken out of the ground in autumn, and laid in dry sand during the winter, secure from frost, and planted again in the spring, they grow much larger and flower earlier than the seedling plants: or when the roots are covered in winter with tanners' bark to keep out the frost, they often remain secure in the borders, where the soil is dry. When the roots thus taken out of the ground are planted the following spring in large pots, and plunged into a hot-bed, under a deep frame, they may be brought forward, and raised to the height of four or five feet, and flower much earlier in the season.

It should be noticed that in collecting the seeds, care should be taken not to save any from the plants which have plain flowers; and in order to have variegated flowers, the plain flowers should be pulled off from those plants which are intended to stand for seed. As the second sort is less hardy than the first and third, unless the plants are brought forward in the spring they seldom flower till very late, and their seeds do not ripen perfectly.

All the sorts are proper for the principal borders of pleasure grounds, being very ornamental in their large branchy growth, as well as in their extensive flowering.

MIRABILIS *Aqua*. See WATER.

MIRABOLANS, or MIROBALANS, in *Pharmacy*. See MYROBALANS.

MIRACHOW, or MIRCHAU, in *Geography*, a town of Prussian Pomerelia; 12 miles W. of Dantzic.

MIRACLE, in a popular sense, is a *prodigy*, or an extraordinary event, that surprises us by its novelty.

MIRACLE, in a more accurate and philosophical sense, is an effect that does not follow from any of the regular laws of nature; or which is inconsistent with some known law of it; or contrary to the settled constitution and course of things: accordingly all miracles presuppose an established system of nature, within the limits of which they operate, and with the order of which they disagree.

Spinoza denies that any power can supersede that of nature; or that any thing can disturb, or interrupt, the order of things; and accordingly defines a miracle to be a rare event, happening in consequence of some laws that are unknown to us.

Divines define a miracle, an extraordinary and wonderful effect above the power of nature, wrought by God, to manifest his power or providence; or to give credit to some messenger

essenger sent from himself. Thus Jesus Christ evinced the truth of his mission, and his doctrine, by miracles; and thus also did Moses. But there are scarcely any theological writers, that precisely agree in their definition of a miracle. Mr. Locke defines it to be a sensible operation, which being above the comprehension of the spectator, is, in his opinion, contrary to the course of nature, and taken by him to be divine. Dr. Clarke's definition of a miracle, in the theological sense of the word, is this: that it is a work effected in a manner unusual, or different from the common and regular method of Providence, by the interposition either of God himself, or of some intelligent agent superior to man, for the proof or evidence of some particular doctrine, or in attestation to the authority of some particular person. According to Dr. Sykes, a miracle is a designed effect, sensible, unusual in itself, beyond the art and power of man to do. Dr. Chandler says, that a miracle is an action done, or an operation visibly performed by any being, which is really and truly above the reach natural power, and capacity of that being who does it, of himself, and without the assistance of some superior agent to perform. With this Dr. Hutcheson's definition nearly coincides, *viz.* that it is a work far exceeding human power, yet performed by the command, or upon the volition of a man. And the same writer further observes, that though miracles may prove the superintendency of a voluntary agent, and that the universe is not guided by necessity or fate; yet that mind must be weak and inadvertent, who needs them to confirm the belief of a wise and good Deity; since the deviation from general laws, unless upon very extraordinary occasions, must be a presumption of inconstancy and weakness rather than of a steady wisdom and power; and must weaken the best arguments we have for the sagacity and power of the universal mind. Inquiry into the Original of the Ideas of Beauty, &c.

Mr. Farmer, a late ingenious and learned writer, objects to all those definitions of miracles, which represent them as effects unusual, above human power, and manifesting the interposition of superior power: because, he says, the term unusual does not distinguish real miracles from many things which are not miraculous, such as the rare and uncommon appearances of nature: nor does the calling a miracle an effect above human power, distinguish it from all other effects equally above human power, produced by superior beings, when acting within their usual sphere, which, for that reason, cannot be miraculous. Besides, as this definition comprehends many things, which are not miraculous, and to which no persons apply the term; so it excludes many things which are allowed by all to be proper miracles. For there seems to be a difference between effects above human power, or which argue a higher degree of power, and effects which argue a power barely different from human, and in no manner superior to it. According to this definition, beasts and birds may work miracles; for they do many things that are above the power of man. Moreover, this definition, instead of describing miracles by the nature of the works themselves, describe them by their author, and the degree of power necessary to their performance. To which it may be added, that works which argue only a power more than human, can be no absolute proofs of a divine interposition: and farther, the last part of the definition, manifesting the interposition of superior power, is superfluous; because it is only saying effects above human power must be produced by a power above it.

This writer considers the contrariety or conformity of the event itself to those laws by which the world is governed in the course of God's general providence, as the only circum-

stance which denominates and constitutes it a proper miracle or not: and, therefore, before we can pronounce with certainty any effect to be a true miracle, it is necessary (and nothing more is necessary than) that the common course of nature be in some degree first understood. Miracles, in this view, are not impossible to the power of God, nor necessarily repugnant to our ideas of his wisdom and immutability. Neither do they imply any inconsistency in the divine conduct, or a defect or disturbance of the laws of nature: so that in the general idea of miracles, considered as variations from the common course of nature, there is nothing that can furnish a certain universal proof against their existence; and there is a power superior to nature, which is ever able, and which in certain circumstances may reasonably over-rule what was at first established. The writer, now cited, farther maintains, that miracles are neither the effects of natural causes, nor of superior created intelligences, acting from themselves alone; but that they are always to be ascribed to a divine interposition; *i. e.* that they are never wrought, but either immediately by God himself, or by such other beings as he commissions and empowers to perform them. In proof of this proposition, he alleges, that the same arguments which prove the existence of superior created intelligences, do much more strongly conclude against their acting out of their proper sphere. Farther, the supposition of the power of any created agents to work miracles of themselves, in this lower world, is contradicted by the observation and experience of all ages; there being, in fact, no proper evidence of the truth of any miracles, but such as may be fitly ascribed to the Deity. Moreover, the laws of nature being ordained by God and essential to the order and happiness of the world, it is impossible God should delegate to any of his creatures a power of working miracles, by which those divine establishments may be superseded and controlled. Besides, the ascribing to any superior beings, God excepted, and those immediately commissioned by him, the power of working miracles, subverts the foundation of natural piety, and is a fruitful source of idolatry and superstition. It is further urged, that if miracles were performed in favour of false doctrines, mankind would be exposed to frequent and unavoidable delusion: and, if they may be performed without a divine permission, and in support of falshood, they cannot be credentials of a divine mission, and criterions of truth. So that, upon the whole, if superior beings really possess the miraculous powers which some writers have ascribed to them, the exercise of those powers, by good and evil agents, would either expose mankind to necessary and invincible error, or entirely destroy the credit and use of miracles, under the idea of criterions of truth and authentic credentials of a divine mission. If we appeal to the evidence of revelation, on this subject, we shall find, that the view which the scripture gives us of good angels, of the devil and his angels, as also of the souls of departed men, is inconsistent with their liberty of working miracles: and the view which the sacred writers give us of the gods of paganism is also absolutely inconsistent with their possessing a power of working miracles. Nevertheless, it has been much disputed, how far it may be in the power of the devil to work miracles? or wherein the specific difference lies between the miracles of Moses, and those of Pharaoh's magicians? those of Jesus Christ and the apostles, and those of Simon Magus and Apollonius Tyaneus? Whether the latter were any more than mere delusions of the senses; or whether any super-natural and diabolical power concurred with them. See MAGICIAN; under which article it is shewn, that the magicians, diviners, and forcerers of antiquity, who pretended by the assistance of

the heathen deities, &c. to foretel future events, or to work miracles, are branded in scripture as mere impostors, incapable of supporting their pretensions by any works or pretensions beyond human power or skill. The scripture likewise reproaches the pretences to inspiration and miracles, made by false prophets, in support of error and idolatry, as the sole effects of human craft and imposture. And, therefore, since angels, whether good or evil, the spirits of departed men, the heathen deities, magicians, and false prophets, are the only agents, who have ever been conceived as capable of working miracles, either in opposition to God, or without an immediate commission from him; and the scripture denies to all these the power of performing any miracles; it does in effect deny, that any single miracle has ever been performed without the immediate interposition of God. It is likewise alleged, that the scriptures represent the one true God, as the sole creator and sovereign of the world, which he governs by fixed and invariable laws; that to him they appropriate all miracles, and that they urge them as demonstrations of his divinity and sole dominion over nature, in opposition to the claims of all other superior beings. The scriptures also uniformly represent all miracles, as being, in themselves, an absolute demonstration of the mission and doctrine of the prophets, at whose instance they are performed; and never direct us to regard their doctrines as a test of the miracles being the effect of divine interposition. Accordingly, the miracles of Christ, in particular, were a demonstration (not a partial and conditional, but a complete and absolute demonstration) of his mission from God: and they were farther designed to evince his peculiar character as the Messiah or anointed; *i. e.* his regal commission and power, or his right by divine designation to dominion and judicature over mankind. And it may be observed, with respect to all the miracles of the New Testament, that their divinity, considered in themselves, is always either expressly asserted, or manifestly implied; and they are accordingly urged as a decisive and absolute proof of the divinity of the doctrine and testimony of their performers, without ever taking into consideration the nature of the doctrine, or of the testimony to be confirmed. It is also shewn, that the scriptures have not recorded any instances of real miracles performed by the devil; in answer to the objections drawn from the case of the magicians in Egypt, from the appearance of Samuel, after his decease, to Saul, which was either the work of human imposture or a divine miracle, and from our Saviour's temptation in the wilderness, which the writer, to whom we now refer, considers as a divine vision. Miracles, considered as the peculiar works of God, afford a divine testimony to the person on whose account they are wrought, and to that doctrine or message, which he delivers in the name of God. And this proof from miracles of the divine commission, and doctrine of a prophet, is in itself decisive and absolute. It is also the most natural and agreeable to the common sense of mankind in all ages. It is the most easy and compendious proof of a new revelation. Miracles are farther a very powerful method of conviction, making a strong impression upon the heart, at the same time that they carry light to the understanding. Nor is the necessity of miracles less evident than their propriety and advantage, in attesting a divine commission and propagating a new revelation. They also serve to revive and confirm the principles of natural religion, and to recover men from those two opposite extremes of atheism and idolatry. Finally, the evidence of miracles, whether of power or knowledge, is the fittest to accompany a standing revelation; because it is not confined to one age or nation, but may be extended over the whole globe, and con-

veyed to the most distant generations. On the nature and design of miracles, already illustrated in this article, see Farmer's Dissertation on Miracles, &c. 8vo. 1771, passim. On the other hand, Dr. Clarke, who allows that miracles may be wrought by other agents besides the Deity, observes that it cannot certainly be distinguished, by the miracle itself, whether any extraordinary interposition of some power superior to men be the immediate interposition of God himself, or of some good angel, or of some evil angel. The only possible ways, says this learned writer, by which a spectator may certainly and infallibly distinguish whether miracles be indeed the works either immediately of God himself, or of some good angel employed by him; and consequently the doctrine witnessed by the miracles be infallibly true and divinely attested: or whether, on the contrary, the miracles be the works of evil spirits, and consequently the doctrine a fraud and imposition upon men, are these: if the doctrine attested by miracles be in itself impious, or manifestly tending to promote vice; then, without all question, the miracles, how great soever they may appear to us, are neither wrought by God himself nor by his commission. If the doctrine, attested by miracles, be in itself indifferent, or such as cannot, by the light of nature and right reason alone, be certainly known whether it be true or false; and at the same time, in opposition to it, and in proof of the direct contrary doctrine, there be wrought other miracles, more and greater than the former, or at least attended with such circumstances as evidently shew the power, by which the latter are wrought, to be superior to the power that produced the former: then that doctrine, which is attested by the superior power, must necessarily be believed to be divine. This, he apprehends, was the case of Moses and the Egyptian magicians. (See MAGICIAN.) If, in the last place, the doctrine attested by miracles be such as, in its own nature and consequences, tends to promote the honour and glory of God, and the practice of universal righteousness among men; and yet nevertheless be not in itself demonstrable, nor could, without revelation, have been discovered to be actually true; and there is no pretence of more or greater miracles, on the opposite side, to contradict it: which is the case of the doctrine and miracles of Christ; then the miracles are unquestionably divine, and the doctrine must, without all controversy, be acknowledged as an immediate and infallible revelation from God. In order to obviate the objection, that we prove in a circle the doctrine by the miracles, and the miracles by the doctrine; he adds, that the miracles, in this way of reasoning, are not at all proved by the doctrine; but only the possibility and the good tendency, or at least the indifferency of the doctrine, are a necessary condition or circumstance, without which, the doctrine is not capable of being proved by any miracles. The doctrine must be in itself possible and capable of being proved, and then miracles will prove it to be actually and certainly true. Boyle's Lecture, Sermons, &c. p. 226, &c. The sufficiency of the argument in attestation to the truth of Christianity, deduced from miracles, has been controverted by several sceptical writers; and particularly by Mr. Hume. It has been alleged, that experience is the ground of the credit we give to human testimony. Having found in past instances that men have informed us right, we are disposed to believe them in future instances; but this experience is by no means constant; for we often find that men prevaricate and deceive. On the other hand, what assures us of those laws of nature, in the violation of which the notion of a miracle consists, is, in like manner, experience. But this is an experience that has never been interrupted. A miracle, it has been said, is an event which, from

from its nature, is inconsistent with all the experience we ever had, and in the highest degree incredible and extraordinary. In the falshood of testimony, on the contrary, there is no such inconsistency, nor any such incredibility, scarcely any thing being more common. No regard, therefore, can be due to the latter, when it is applied as a proof of the former. According to this reasoning, applied to the case of miracles, we are to consider which is most likely, that such events should happen, or that men should either deceive or be deceived. And as there is nothing more unlikely than the former, or much more common than the latter, particularly where religion is concerned, it will be right to form a general resolution, never to lend any attention to accounts of miracles, with whatever specious pretext they may be covered." "It is," says Mr. Hume in his "Essay on Miracles," "a maxim worthy of our attention, that no testimony is sufficient to establish a miracle, unless the testimony be of such a kind, that its falshood would be more miraculous than the fact which it endeavours to establish. And even in that case, there is a marked distinction of arguments, and the superior only gives us an assurance suitable to that degree of force, which remains after deducting the inferior. When any one tells me that he saw a dead man restored to life, I immediately consider with myself, whether it be more probable that the person should either deceive or be deceived, or that the fact he relates should really have happened. I weigh the one miracle against the other, and according to the superiority which I discover, I pronounce my decision, and always reject the greater miracle. If the falshood of his testimony would be more miraculous than the event which he relates, then, and not till then, can he pretend to command my belief or opinion." For such reasons as these Mr. Hume asserts, "that the evidence of testimony, when applied to a miracle, carries falshood on the very face of it, and is more properly a subject of derision than of argument;" and that whoever believes the truth of the Christian religion "is conscious of a continued miracle in his own person, which subverts all the principles of his understanding, and gives him a determination to believe what is most contrary to custom and experience." The principles on which this objection is founded, says an excellent writer, Dr. Price, are chiefly, "that the credit we give to testimony is derived solely from experience;" "that a miracle is a fact *contrary* to experience;" "that the previous improbability of a fact is a proof against it, diminishing, in proportion to the degree of it, the proof from testimony for it;" and "that no testimony should ever gain credit to an event, unless it is more extraordinary than it should be false, than that the event should have happened." Our author, in his examination of these opinions, begins with considering the nature and foundation of that assurance which experience gives us of the laws of nature. After a variety of ingenious observations on the nature and degree of the assurance with regard to future events, which we derive from past experience of the course of nature, this writer states the result of the whole in the following manner. "Upon observing, that any natural event has happened often or invariably, we have only reason to expect that it will happen again, with an assurance proportioned to the frequency of our observations. But we have no *absolute proof* that it will happen again in any future trial; nor the least reason to believe that it will always happen. For aught we know, there may be occasions on which it will fail, and secret causes in the frame of things which *sometimes* may counteract those by which it is produced." In examining the ground of the regard we pay to human testimony, our author concludes,

that it is not experience only, or that kind of experience to which we owe our expectation of natural events, the cause of which are unknown to us. We feel in ourselves, that a regard to truth is one principle in human nature; and we know, that there must be such a principle in every reasonable being; and to this chiefly owing the credit we give to human testimony. It is plain and capable of the most satisfactory proof, that there is a great difference between the conviction produced by testimony, and the conviction produced by experience, and the one is capable of being carried much higher than the other. Besides, the greatest part of what is commonly called experience is merely the report of testimony. "Our own experience," says Dr. Adams, "reaches around, and goes back but a little way; but the experience of others, on which we chiefly depend, is derived to us wholly from testimony." In proportion, therefore, as we weaken the evidence of testimony, we weaken also that of experience; and in comparing them we ought in reason to oppose to the former, only what remains of the latter after that part of it which is derived from the former, that is, after much the greatest part of it, is deducted. From this reasoning it follows, that there is no absurdity in using *testimony* for proving a *miracle*. This is not using a *weaker* experience to overthrow another of the same kind, which is *stronger*; but using an argument to establish an event, which yields a direct and positive proof, and is capable of producing the strongest conviction, to overthrow another founded on different principles, and which, at best, can prove no more than that, previously to the event, there would have appeared to us a presumption against its happening.

Moreover, a miracle cannot, with propriety, be styled an event *contrary* to experience; as Mr. Hume asserts. A miracle, says our author, is more properly an event *different* from experience than *contrary* to it; nor can it be proper to assert, as Mr. Hume does, that in every case of a miracle supported by testimony, there is a contest of two opposite experiences, the strongest of which ought always to determine our judgments. In Mr. Hume's argument there is, as Dr. Price intimates, a fundamental error: it is where he declares, that, "if, previously to an event, there was a greater probability *against* its happening, than there is *for* the truth of the testimony endeavouring to establish it, the former destroys the latter, and renders the event unlikely to have happened in proportion to its superiority." This is evidently a fundamental point in Mr. Hume's objection; or, in other words, in the principle, that no testimony should engage our belief, except the improbability in the falshood of it is greater, than that in the event which it attests. In order to evince the erroneousness of this principle, what our author wishes to be considered is, the degree of improbability which lies against almost all the common facts, independently of the evidence of testimony for them. In many cases of particular histories, which are immediately believed on the slightest testimony, there would have appeared to us, previously to this testimony, an improbability of almost infinity to one against their reality, as any one must perceive, who will think how sure he is of the falshood of all facts, that have *no* evidence to support them, or which he has only *imagined* to himself. It is then very common for the slightest testimony to overcome an almost infinite improbability. That this is the case our author has rendered evident by a train of satisfactory reasoning, which we have not room to introduce. For further particulars we must refer to the author himself, *ubi infra*.

Archdeacon Paley has, with his usual perspicuity, examined the objection of Mr. Hume against the credibility of miracles,

miracles, which we have above stated. Having premised that there is no antecedent improbability of a revelation from God, but that the contrary is the case; and that there is no way in which such a revelation can be made but by miracle, it is not improbable that miracles should be wrought. The improbability which arises from the miraculous nature of the things related is not greater than the original improbability that such a revelation should be imparted by God. Admitting then, that a revelation is not improbable, and that if there be a revelation, there must be miracles, the objection that no human testimony can render miracles credible must appear to be unfounded. Mr. Hume's principle, concisely stated, is this; that the truth of a miracle is contrary to experience, but it is not contrary to experience that testimony should be false. Our author observes that the term "experience," and the phrases "contrary to experience," or "contradicting experience," are ambiguous, and require explanation. Strictly speaking, the narrative of a fact is *then* only contrary to experience, when the fact is related to have existed at a time and place, at which time and place, we, being present, did not perceive it to exist. In this case the assertion is contrary to experience, properly so called; nor is it of any consequence, whether the fact be of a miraculous nature or not. This is a contrariety which no evidence can surmount. But this is not the experience, nor contrariety, which Mr. Hume meant to express in his objection; short of this, no intelligible signification can be affixed to the term "contrary to experience," but one, *viz.* that of not having experienced any thing similar to the thing related, or such things not being generally experienced by others. Now the improbability which arises from the want of experience, not contradiction to it, is only equal to the probability there is, that if the thing were true, we should experience things similar to it, or that such things would be generally experienced. Supposing then that miracles were wrought upon the first promulgation of Christianity, when nothing but miracles could decide its authority, is it certain that such miracles would be repeated so often, and in so many places, as to become objects of general experience? Is it a probability approaching to certainty? Is it a probability of any great strength or force? Is it such as no evidence can encounter? And yet this probability is the exact *converse*, and therefore the exact measure of the improbability which arises from the want of experience, and which Mr. Hume represents as invincible by human testimony. The force of experience, continues our author, is founded in the presumption, either that the course of nature is invariable, or that, if it be ever varied, variations will be frequent and general. Has the necessity of this alternative been demonstrated? Calling the course of nature the agency of an intelligent Being, is there any good reason for judging this state of the case to be probable? Ought we not rather to expect, that such a Being, upon occasions of peculiar importance, may interrupt the order which he had appointed, yet that such occasions should return seldom; that these interruptions consequently should be confined to the experience of a few; that the want of it, therefore, in many, should be matter neither of surprise nor objection? But it is said, that in our account of miracles, we assign effects without causes, or we attribute effects to causes inadequate to the purpose, or to causes of the operation of which we have no experience. Of what causes, we may ask, and of what effects, does the objection speak? If it be answered that, when we ascribe the cure of the palsy to a touch, of blindness to the enointing of the eyes with clay, or the raising of the dead to a word, we lay ourselves open to this imputation; we reply, that we ascribe no such effects to such causes. We perceive no virtue or energy in these things more than in other

things of the same kind. They are merely signs to connect the miracle with its end. The effect we ascribe simply to the volition of the Deity; of whose existence and power, not to say of whose presence and agency, we have previous and independent proof. We have therefore all we seek for in the works of rational agents, a sufficient power and an adequate motive. In a word, once believe that there is a God, and miracles are not incredible. Mr. Hume, as our author proceeds, states the case of miracles to be a contest of opposite improbabilities, that is to say, a question whether it be more improbable that the miracle should be true, or the testimony false. In this statement, however, there is a want of argumentative justice; because, in describing the improbability of miracles, he suppresses all those circumstances of extenuation, which result from our knowledge of the existence, power, and disposition of the Deity, his concern in the creation, the end answered by the miracle, the importance of that end, and its subserviency to the plan pursued in the works of nature. As Mr. Hume has represented the question, miracles are alike incredible to him who is previously assured of the constant agency of a divine Being, and to him who believes that no such being exists in the universe. They are equally incredible, whether related to have been wrought upon occasions the most deserving, and for purposes the most beneficial, or for no assignable end whatever, or for an end confessedly trifling or pernicious. This surely cannot be a correct statement. In adjusting also the other side of the balance, the strength and weight of testimony, the author has provided an answer to every possible accumulation of historical proof, by telling us, that we are not obliged to explain how the story or the evidence arose. The archdeacon thinks that we are obliged to do this. The existence of the testimony is a phenomenon: the truth of the fact solves the phenomenon. If we reject this solution, we ought to be able to recur to some other; and none even by our adversaries can be admitted, which is not consistent with the principles that regulate human affairs and human conduct at present, or which makes men *then* to have been a different kind of beings from what they are now. Our author adds; the short consideration, which, independently of every other, convinces me, that there is no solid foundation in Mr. Hume's conclusion, is the following: when a theorem is proposed to a mathematician, the first thing he does with it is to try it upon a simple case; and if it produce a false result, he is sure that there must be some mistake in the demonstration. Let us proceed in this way with what may be called Mr. Hume's theorem. "If 12 men, whose probity and good sense I had long known, should seriously and circumstantially relate to me an account of a miracle wrought before their eyes, and in which it was impossible that they should be deceived; if the governor of the country, hearing a rumour of this account, should call these men into his presence, and offer them a short proposal, either to confess the imposture, or submit to be tied up to a gibbet; if they should refuse with one voice to acknowledge that there existed any falsehood or imposture in the case; if this threat were communicated to them separately, yet with no different effect; if it was at last executed; if I myself saw them, one after another, consenting to be racked, burnt, or strangled, rather than give up the truth of this account; still, if Mr. Hume's rule be my guide, I am not to believe them. Now I undertake to say, that there exists not a sceptic in the world who would not believe them; or who would defend such incredulity."

Having explained the nature and evinced the credibility of miracles in general, we might take occasion to illustrate the evidence which the miracles, that are recorded by the founders and advocates of Christianity, afford in attestation of its truth and

and divine origin. Admitting the credibility of miracles in general, and of the Christian miracles in particular, we might allege many direct, collateral, and presumptive arguments in proof of their reality. The miracles which the New Testament records, are in their own nature and design worthy of the wisdom, power, and benevolence to which they are ascribed. If we consider these miracles in themselves, in their number and variety as well as their nature, in the state and circumstances of those who were the objects of them, in the mollifications and yet public manner of their being wrought, in the multitude and also the disposition and character of those who witnessed them, in the extent and permanence of their effects, and in their connection with the reception and prevalence of the religion which they were intended to introduce and establish, we cannot question their reality: we cannot discover any traces of collusion and deceit; we cannot hesitate in allowing them to be such as the evangelical historians have described and recorded. As for the historians themselves, their character and conduct, their labours and sufferings undergone and endured in attestation to the truth of the facts which they relate, and the death which they preferred to the infamy of renouncing their belief of them, evince, in the most satisfactory manner, their integrity, and preclude every suspicion of fraud and imposture. This testimony, transmitted to us with every attendant circumstance of credibility, claims our confidence, and whilst we believe the reality of the miracles which they record, we cannot demur in tracing the religion which, by their writings and teaching, they have communicated to the world, to a divine origin. But we must desist from enlarging, and refer our readers to Price's *Four Dissertations*, Diss. 4. Paley's *View of the Evidences of Christianity*, vol. i. Adams's *Ess. on Miracles*. Bishop Douglas's *Criterion*. Campbell's *Dissertation on Miracles*. See *CHRISTIAN RELIGION, REVELATION, NEW TESTAMENT*, and other similar articles in the *Cyclopædia*.

The Romans attribute miracles to their emperors Adrian and Vespasian. The church of Rome abounds in miracles: if we believe their writers, some of their monks have wrought more miracles than all the apostles; and this without any visible necessity for them.

Mr. Hume has confronted the miracle of Vespasian related by Tacitus, that performed in a Spanish church, and related by cardinal de Retz, and the cures said to be performed at the tomb of the abbé Paris, in the early part of the last century, with those of the New Testament. With respect to the latter miracles, we observe, that the patients who frequented the abbé's tomb were so affected with their devotion, their expectation of relief, the place, the solemnity, and above all, by the sympathy of the surrounding multitude, that many of them were thrown into violent convulsions, which convulsions, in certain instances, produced a removal of disorders, depending upon obstruction. The above account may now be admitted with less difficulty, because the same or similar effects have been experienced in the operations of *animal magnetism*. See on the subject of these miracles, Douglas's *Criterion*.

As full as the Romish church has pretended to be of saints, it has been a rule with them, that none should be ever canonized till there be a good proof of their having wrought miracles. So that were all those allowed to be good miracles, and to have happened out of the common order of nature, they are so numerous, that one would be tempted to think there was no order or law of nature at all.

Some Protestant writers have maintained, that the power of working miracles was exercised in the Christian church during the three or four first centuries; in proof of which they allege that of the thundering legion, &c. But Dr.

Madleton, in his *Free Inquiry into the miraculous Powers*, which are said to have subsisted in the Christian church, &c. has maintained a very different opinion. And it must be acknowledged, that the evidence of the facts is, to say the least of it, very doubtful.

The many and stupendous miracles which are said to have been wrought by the Christian missionaries, who were sent to convert the barbarous nations, in the eighth century, have lost, in our times, the credit they obtained in former ages.

St. Augustine is a strong advocate for miracles. He mentions several, of which he was an eye-witness; and others, of which he was informed by those that were. In the single city of Hippo, he tells us there were seventy miracles wrought in the space of two years, on the building of a chapel in honour of St. Stephen. There are those, however, who set aside the authority of all miracles; thinking it unbecoming the wisdom of God to establish such laws, as that he should find it frequently necessary to supersede. And as the former, from the avowed authority of some miracles, fetch an argument for the truth of all, pleading those which are allowed as well as those which are questioned; so these allege the false ones very unfairly, as conclusions against all.

MIRADOUX, in *Geography*, a town of France, in the department of the Gers, and chief place of a canton, in the district of Lectoure; 7 miles N.E. of Lectoure. The place contains 1655, and the canton 6343 inhabitants, on a territory of 157½ kilometres, in 12 communes. N. lat. 44°. E. long. 0 50'.

MIRAFLORES, a town of South America, in the province of Tucuman, on the Salado; 50 miles N.N.E. of St. Miguel de Tucuman.—Also, a town of Peru, in the audience of Lima; 8 miles S. of Lima.

MIRAGE, the name given by the French sailors to an optical phenomenon, on which M. Monge read a memoir to the institute at Cairo, during the French invasion of Egypt. It often happens at sea, that a ship seen at a distance appears as if painted in the sky, and not to be supported by the water. A similar effect was observed by the French in the course of their march through the desert; the villages seen at a distance seemed to be built on an island in the middle of a lake. In proportion as they approached, the apparent surface of the water became narrower; when they were only at a small distance, it disappeared, and the same illusion began, in regard to the next village. M. Monge ascribes this effect to a diminution of the density of the lower stratum of the atmosphere. This diminution in the desert is produced by the increase of heat, arising from that communicated by the rays of the sun to the sand, with which this stratum is in immediate contact. At sea it takes place when, by particular circumstances, such as the action of the wind, the lower stratum of the atmosphere holds in solution a greater quantity of water than the other strata. In this state of things the rays of light, which come from the lower parts of the heavens, having arrived at the surface that separates the less dense stratum from those above it, do not pass through that stratum, but are reflected, and paint in the eye of the observer an image of the heavens, which appearing to him to be below the horizon, he takes it for water, when the phenomenon occurs at land. If he is at sea, he thinks he sees in the heavens all the objects which float on that part of the surface occupied by the image of the heavens. This phenomenon has been considered and explained by several English philosophers. See *Horizontal REFRACTION*.

MIRAGOANE, in *Geography*, a town on the north side of the south peninsula of the island of St. Domingo, and south side of the bight of Leogane, at the head of a bay of its name; 15 miles W. of Petit Goave.

MIRALETUS, in *Ichthyology*, a name given to the species of ray, commonly called by others *raja oculata*. See RAJA *Miraletus*.—Also, a name given by Bellonius and others to the RAJA *Oxyrinchus*; which see.

MIRAMACHI, or MIRACHI, in *Geography*, a port, bay, and river, on the north coast of New Brunswick. The port is at the entrance of the bay. In the river there is a salmon fishery.

MIRAMBEAU, a town of France, in the department of the Lower Charente, and chief place of the district of Jonzac; 12 miles S. of Pons. The place contains 2170, and the canton 15,117 inhabitants, on a territory of 242½ kilometres, in 19 communes.

MIRANA, a small island in the North Pacific ocean. N. lat. 62° 35'. E. long. 190° 34'.

MIRANDA, a town of Spain, in Navarre; 13 miles S.E. of Estalla.—Also, a town of Naples, in the country of Molise; 11 miles W. of Molise.

MIRANDA de Corvo, a town of Portugal, in the province of Beira, containing about 2700 inhabitants; 15 miles S.E. of Coimbra.

MIRANDA de Duero, a town of Portugal, in the province of Tras-los-Montes, situated in a barren mountainous country on the Duero, on the frontiers of Spain; the see of a bishop. It is but a poor mean town; 28 miles S.E. of Braganza. N. lat. 41° 24'. W. long. 5° 56'.

MIRANDA d'Ebro, a small town of Spain, in Old Castile, beautifully situated on the Ebro, over which is a noble bridge of eight arches. It contains a large square, embellished with fountains. It is environed by mountains, on whose brow are the remains of a castle, and the ruins of several towers, which formerly guarded access to it. A copious stream flows from the mountain, which serves to work several mills in its vicinity. The town was erected into an earldom, in the 14th century, by Henry IV., in favour of Don Diego de Zuniga, and is now governed by its alcade; 32 miles N.E. of Burgos.

MIRANDE, a town of France, and principal place of a district, in the department of the Gers. The place contains 1558, and the canton 10,316 inhabitants, on a territory of 292½ kilometres; in 49 communes. N. lat. 43° 31'. E. long. 0° 28'.

MIRANDELA, a town of Portugal, in the province of Tras-los-Montes; 30 miles S.W. of Braganza. N. lat. 41° 25'. W. long. 6° 58'.

MIRANDOLA, *Duchy of*, a small principality of Italy, almost surrounded by the duchy of Mantua. This principality shared the fate of Modena, and became a part of the Cisalpine republic, now the kingdom of Italy.—Also, a city of Italy, in the department of Panaro; lately capital of a duchy united with Modena, strong, and defended by a citadel; the see of a bishop. It contains, besides the cathedral, 15 churches; 14 miles N.N.E. of Modena. N. lat. 44° 50'. E. long. 11° 5'.

MIRANO, a town of Italy, in the Paduan, on the river Musan, containing about 3120 inhabitants; 12 miles N.E. of Padua.

MIRAPORVOS, a rocky islet among the Bahamas, near the south-west coast of Crooked island. N. lat. 21° 55'. W. long. 74° 46'.

MIRAPOUR, a town of Bengal; 30 miles E. of Burdwan.—Also, a town of Hindoostan, in the circar of Schaurunpour; 15 miles N. of Merat.

MIRASOLE, a town of Italy, in the department of the Mincio; 9 miles S.S.E. of Mantua.

MIRAVALLS, a town of Spain, in the province of Biscay; 9 miles S. of Bilbao.

MIRAVEL, a town of Spain, in New Castile, on the side of a hill, defended by a strongly fortified castle; 12 miles S.S.W. of Placencia.

MIRAW, or MEROW, a town of Moravia, in the circle of Olmutz; 22 miles N.W. of Olmutz.

MIRAY BAY, a bay on the coast of the island of Cape Breton. Large vessels may go up six leagues, have good anchorage, and lie secure from all winds. N. lat. 46° 5'. W. long. 59° 49'.

MIRBELIA, in *Botany*, named by the writer of this article, in honour of Monf. Mirbel, Superintendent of the botanic garden at Malmaison, member of various learned academies, and author of several excellent works on the anatomy and physiology of vegetables. His elucidations of their reticulated structure having excited much attention, the present plant, remarkable for the reticulated aspect of its leaves, was judged more particularly suited to perpetuate his name. Smith in *Smith and Konig's Annals of Botany*, v. 1. 511. Brown in *Ait. Hort. Kew. ed. 2. v. 3. 21.*—Class and order, *Decandria Monogynia*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, sect. 4. Juss.

Gen. Ch. *Cal.* Perianth inferior, bell-shaped, two-lipped, without appendages; somewhat angular at the base: upper lip of two abrupt, oblique, parallel segments; lower of three lanceolate, acute, equal ones, dilated at the base, rather shorter than the upper: permanent. *Cor.* papilionaceous, of five petals, about twice the length of the calyx; standard inversely heart-shaped, recurved, with a short, broad, linear claw; wings lanceolate-oblong, rather shorter than the standard, with a tooth at the upper edge; keel shorter than the wings, of two cohering, half-ovate petals, with linear claws. *Stam.* Filaments ten, awl-shaped, equal, contained within the keel, inserted into the receptacle; anthers roundish, incumbent. *Pist.* Germen superior, ovate-oblong; style thick and short, bent upwards; stigma capitate. *Peric.* Legume heart-shaped, pointed, tumid, with a groove at each side, of two cells, at length separating from each other; the partition double, from both the inflexed margins of each valve. *Seeds* solitary, attached to the lower edge of each valve, oval, compressed, with a circular bordered scar.

Ess. Ch. Calyx five-cleft, two-lipped. Corolla papilionaceous. Style reflexed. Stigma capitate. Legume of two cells, tumid, with two seeds; the partition double.

1. *M. reticulata*. Reticulated Mirbelia. Sm. as above. Tr. of Linn. Soc. v. 9. 265. Venten. Malmaif. t. 119. (*Pultenæa rubicifolia*; Andr. Repof. t. 351.)—Leaves linear-lanceolate, veiny.—Native of the neighbourhood of Port Jackson, New South Wales. *Dr. White*. It was very early raised from seeds in this country, and is kept in the green-house, in light sandy peat earth, with little water in winter, but as much air as possible; flowering from May to August, the second year after being sown. The stem is shrubby, much branched, and very bushy, smoothish, leafy, angular; the branches mostly ternate, straight, and spreading. *Leaves* almost always three in a whorl, rarely opposite only, on very short broad footstalks, spreading, an inch long, linear-lanceolate, sometimes elliptical and shortened, smooth, revolute, slightly crenate or wavy, tipped with a spine, furnished with one rib and many transverse veins; paler and most opaque beneath. *Flowers* in little axillary and terminal tufts, on short stalks; with a pair of linear bractæas in the middle of each stalk. *Corolla* light purple, with a radiating reddish stain at the base of the standard. *Legume* a quarter of an inch long, grey, smooth, transversely veined. It is curious that this shrub should ever have been mistaken

mistaken for a *Rubia*, which was actually the case before it flowered.

2. *M. dilatata*. Lobed-leaved *Muhelia*. Brown in Ait. Hort. Kew. n. 2. — Leaves wedge shaped, dilated and three cleft at the extremity. — Found by Mr. Brown on the fourth-west coast of New Holland. This species was sent to Kew, in 1803, by Mr. Peter Good and flowers in the green-house in May and June. The stem is shrubby. We have seen no specimen, nor is any account given of the colour of the flowers.

MIRCHOUR, in *Geography*, a town of Hindoostan, in Golconda; 20 miles S. E. of Canoul.

MUREBALAIS, an interior town in the French part of the island of St. Domingo; 30 miles N. of Port au Prince.

MIREBEAU, a town of France, in the department of the Cote d'Or, and chief place of a canton, in the district of Dijon; 13 miles N. E. of Dijon. The place contains 1100, and the canton 8,78 inhabitants, on a territory of 257½ kilometres, in 27 communes. — Also, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Poitiers; 12 miles N. N. E. of Poitiers. The place contains 221, and the canton 7096 inhabitants, on a territory of 192½ kilometres, in 14 communes. N. lat. 46° 47'. E. long. 0° 16'.

MIRECOURT, a town of France, and principal place of a district, in the department of the Vosges; 13 miles N. W. of Epinal. The place contains 5084, and the canton 11,757 inhabitants, on a territory of 175 kilometres, in 28 communes. N. lat. 43° 18'. E. long. 0° 13'.

MIREMONT, a town of France, in the department of the Dordogne; 10 miles S. W. of Montignac. Also, a town of France, in the department of the Upper Garonne; 7 miles S. E. of Muret.

MIRENI, a town of Walachia, on the Ardgis, near its confluence with the Danube; 30 miles S. of Bucharest.

MIREPOIX, a town of France, and principal place of a district, in the department of the Arriege; 18 miles N. E. of Tarascon. The place contains 2819, and the canton 13,589 inhabitants, on a territory of 335 kilometres, in 37 communes. N. lat. 43° 5'. E. long. 1° 56'.

MIREVELT, MICHAEL JANSON, in *Biography*, a portrait painter, born at Delft in 1568. The extreme resemblance of his pictures, the freshness of their colour, and the neatness of their execution, procured Mirevelt a most extraordinary influx of professional occupation; so much, that he is reported by Houbraken to have painted 5000 portraits: for the smallest of which, merely a head, he was paid about 15*l.* sterling; and those of larger sizes in proportion.

He certainly was a very ingenious artist, and, where the talents of Rubens were unknown, must have appeared a luminary of his day; but the superior taste and freedom exhibited in the works of the latter, and afterwards in those of his extraordinary pupil Vandyke, render the works of Mirevelt tame and insipid. He died in 1641.

MIREVELT, PETER, son of the former, and a painter of the same taste, style, and study. By many he is thought fully equal to his father.

MIRGONDA, in *Geography*, a town of Hindoostan, in Dowlatabad; 25 miles S. W. of Beder.

MIRGOROD, a town of Russia, in the government of Kiev; 100 miles E. S. E. of Kiev. N. lat. 50°. E. long. 32° 54'.

MIRIAM, in *Sacred History*, the sister of Aaron, and a prophetess. When Moses had finished his pious effusions in the first hymn on record, after the safe passage of the Red sea, at the head of the whole people of Israel, just escaped

from bondage, he was crowned on this occasion by Miriam, "who took a timbrel in her hand, and all the women went out after her with timbrels and with dances, and Miriam answered them, Sing ye to the Lord," &c.

Here is an early instance of women being permitted to bear a part in the performance of religious rites, as well as of vocal music being accompanied by instrumental, and by what was called *dancing*, which was probably nothing more than moving or marching in regulated steps and gesture.

MIRJANAGORE, in *Geography*, a town of Bengal; 15 miles S. of Moorley.

MIRICK, CAPE, a cape on the west coast of Africa. N. lat. 19°. W. long. 6° 5'.

MIRIOSITO, a town of European Turkey, in Romania; 24 miles N. E. of Gallipoli.

MIROBRIGA, in *Ancient Geography*, a town of Spain, the site of which is now occupied by CIVIDAD Rodrigo; which see. This town of Leon was built in the reign of Ferdinand II, about the 13th century, and was made a rampart against Portugal. It is situated in a flat and tolerably beautiful country, producing abundance of the necessaries of subsistence. Its plains extend five leagues to the north, and are terminated by a chain of mountains, which are branches of those of Bejar, Pena de Francia, and Geta. The town is fortified, and is the see of a bishop. It has seven gates, and its streets are tolerably regular. Its population amounts to about 10,000 inhabitants. It has a cathedral, a collegiate church, six parish churches, five convents of monks, four of nuns, one seminary, and two hospitals. The river Ague passes close to the town. The ancient Roman aqueduct is destroyed; but the inhabitants have constructed another, which conveys the water requisite for the town and watering of the trees, through the space of three leagues. There are also some fountains out of the walls; and in the extent of the diocese are some medicinal waters, copper, lead, iron, and even gold mines.

MIROPEL, in *Geography*, a town of the duchy of Warsaw; 40 miles W. N. W. of Berdiczow.

MIRROPOLBE, a town of Russia, in the government of Cherkov; 88 miles N. N. W. of Charkov. N. lat. 51° 22'. E. long. 34° 34'.

MIROUETTE, in the *Manege*, is used for a dapple-bay.

MIROW, in *Geography*, a town of the duchy of Mecklenburg; 44 miles N. of Spandau.

MIROWITZ, a town of Bohemia, in the circle of Prachatitz; 18 miles N. N. E. of Strakonitz.

MIRROR, a *speculum*, or body, which exhibits the images of objects presented to it by reflection.

The use of mirrors is very ancient. Mention is made of brazen mirrors, or looking-glasses, in Exodus, xxxviii. 8. where Moses is said to have made a "brazen laver, or basin, of the looking-glasses of the women continually assembled at the door of the tabernacle." It is true some modern commentators will not allow the mirrors themselves to have been brass; but of glass, only set or framed in brass. But the most learned among the rabbins do all allow, that in those times the mirrors made use of by the Hebrew women in dressing their heads were of metal; and that the devout women, mentioned in this passage, made presents to Moses of all their mirrors, to make the brazen laver. See the Jesuit Bopferius's comment on this text. See GLASS.

It might likewise be proved, that the ancient Greeks made use of brazen mirrors, from divers passages among the ancient poets.

MIRROR, in the more confined sense of the word, is peculiarly used to signify a smooth surface of glass, tinned and

quicksilvered on the back-side; which exhibits the images of objects opposed to it. See LOOKING-GLASS.

MIRROR, in *Catoptrics*, denotes any polished body impervious to the rays of light, and which of consequence reflects them equally.

Thus water in a deep well or river, and smooth polished metals, are ranked among the number of mirrors.

In this sense, the doctrine of mirrors makes the subject of catoptrics.

Mirrors are made either of glass, coated with an amalgam of mercury and tin, or of metal, as of platina, of silver, or of an alloy of copper and tin, to which a little arsenic and silver are sometimes added. Mirrors of metal are more perfect than those of glass, because they are free from the inconvenience of a double reflection; but they are more expensive, and are liable to tarnish. Where a large mirror is required, with only a weak reflection, we may employ a single surface of glass, the back of the piece being covered with a black coating of some substance differing little from glass in its refractive density, by means of which the second reflection is avoided. See SPECULUM.

The doctrine of mirrors is founded on the following general principles.—1. Light reflected from any mirror, or speculum D E, makes the angle of incidence equal to that of reflection; which see demonstrated under the word REFLECTION.

Hence, a ray of light, as H B. (*Plate XIII., Optics, fig. 1.*) falling perpendicularly on the surface of a speculum D E, will be reflected back upon itself: as we find by experience it actually is.

From the same point of a mirror, therefore, B, there cannot be several rays reflected on the same point; since, in that case, all the angles of incidence must be equal to the same angle of reflection C B G, and therefore to each other; which is absurd. Nor can the ray A B be reflected to two or more points; since, in that case, all the angles of reflection would be equal to the same angle of incidence A B F; which is likewise absurd.

2. From every point of a mirror, are reflected rays thrown on it from every point of a radiant object. Since then rays coming from different parts of the same object, and striking on the same point of the mirror, cannot be reflected back to the same point; the rays which flow from different points of the same radiating object are again separated after reflection: so that each point shews whence it came.

Hence it is, that the rays reflected from mirrors exhibit the objects to view. Hence also, it appears, that rough uneven bodies must reflect the light in such a manner as that rays coming from different points will be blended or thrown confusedly together.

Mirrors may be divided into *plane, concave, convex, cylindrical, conical, parabolical, and elliptical.*

MIRRORS, *Plane*, are those which have a plane or flat surface.

These, by a popular name, we call *looking-glasses.*

For the manner of making plane mirrors, or specula, see LOOKING-GLASS.

MIRRORS, *Laws and Phenomena of Plane.* 1. In a plane mirror, every point of an object, as A, (*Plate XIII., Optics, fig. 2.*) is seen in the intersection B, of the cathetus of incidence A B, with the reflected ray C B.

Let C D and F E be two reflected rays, corresponding to the incident rays A D, A E: then, since the vertical angle C D G = E' D B; and the angle of reflection C D H = A D G the angle of incidence, A D H will be = C D G = E D B. And H E F = D E B, and H E F = A E G, therefore D E B = A E G. But A E G + A D E, as

well as B E D + B D E, are less than two right angles; consequently the reflected rays F E and C D meet in B, and in the equiangular triangles A D E and D E B, having D E common, D B = D A. Wherefore, since the angle B D G = C D H = A D G, the angles at G will be equal, and consequently A B perpendicular to H G: *i. e.* A B is the cathetus of incidence: and, therefore, the reflected rays F E and C D meet with the cathetus of incidence A B in the same point B: and the radiant point A is seen in B.

Hence, 1. As all the reflected rays meet with the cathetus of incidence in B; by whatever reflected ray the radiant point A be seen, it will still appear in the same place. Consequently, any number of persons, viewing the same object in the same mirror, will all see it in the same place behind the mirror. And hence it is, that the same object has only one image, and that we do not see it double with both eyes.

Hence, also, the distance of the image B, from the eye C, is compounded of the ray of incidence A D, and the reflected ray C D: and the object A radiates reflectedly in the same manner as it would do directly, were it removed into the place of the image.

2. The image of a radiant point, B, appears just so far behind a plane mirror, as the radiant point is before it: because A G = B G.

Hence, if the mirror H G be placed horizontally, the point A will seem so much below the horizon, as it is really elevated above it; consequently, erect objects will appear as if inverted; and therefore men standing on their feet, as if on their heads. Or, if the mirror be fastened to the ceiling of a room, parallel to the horizon, objects on the floor will appear above the ceiling as much as they really are below it; and inverted.

3. In a plane mirror the images are perfectly similar, and equal to the objects; for every point of the object is seen in the cathetus of incidence, and the mirror bisects that part of it which is intercepted between the radiant point and its image. And hence the use of mirrors as looking-glasses.

4. In a plane mirror, things on the right hand appear as on the left; and *vice versa.*

Hence, also, we have a method of measuring any inaccessible altitude, by means of a plane mirror. Thus, the mirror being placed horizontally in C (*fig. 3.*), retire from it till such time as the top of the tree be seen in it. Measure the height of the eye D E, the distance of the station from the point of reflection E C, and the distance of the foot of the tree from the same: then to E C, C B, and E D, find a fourth proportional A B. This is the altitude sought.

5. If a plane mirror A E (*fig. 4.*) be inclined to the horizon E H, in an angle of 45 degrees, an object C B perpendicular to it will appear parallel, I K, and the horizontal object L B perpendicular in M K.

For produce B C till it meets the mirror in A; then as H is a right angle, and E = 45°, A will be = 45°: therefore, if from B be drawn B G perpendicular to the mirror A E, A B G will be = 45°; and A G = G B. Let G K be = G B, and the image of B will be in K; draw K A, and because K G = G A and G a right angle, K will be = 45°, and therefore K A parallel to E H. In the same manner it may be shewn, that the point C would appear in I, and consequently the image I K will be parallel to the horizon E H; and *vice versa.* Hence, the eye being placed beneath the mirror, the earth will appear perpendicularly over it: or if placed over the earth will appear

appear perpendicularly under it. Hence, also, a globe descending down a plane a little inclined, may, by means of a mirror, be exhibited as mounting up a vertical plane, to the great surprize of such as are unacquainted with catoptrics. And hence we have a method of representing ourselves as if flying: for a mirror inclined to the horizon under an angle of 45° , we have observed, will represent vertical objects as if horizontal; consequently, a large mirror being so disposed, as you advance towards it, you will seem to move horizontally; and nothing will be wanting to the appearance of flying, but to strike out the arms and legs. It must be added, however, that as the floor is elevated along with you, your feet will still be seen to walk as along a vertical plane. To deceive the eye entirely, therefore, it must be kept from the feet.

6. If the object AB (fig. 5.) be parallel to the speculum CD , and equally distant from it, with the eye; the reflecting line CD will be half the length of the object AB .

Let the eye O be in the object AB , or let the spectator view himself in a glass. Since AB is parallel to CD , the image $G H$ will be parallel to it likewise. From O let fall OL perpendicular to CD , which, continued to I , will be also perpendicular to $G H$; therefore, OL and $O I$ will be the respective altitudes of the triangles $O C D$ and $O G H$, which triangles, having the angles $x = o$ and $u = y$, are similar: consequently $C D : G H :: O L : O I$; and as $O L = \frac{1}{2} O I$, by art. 2. above, $C D$ will be $= \frac{1}{2} G H = \frac{1}{2} A B$.

And hence, to be able to see the whole body in a plane mirror, its height and breadth must be half your height and breadth. Consequently the height and breadth of any object to be seen in a mirror being given, we have also the height and breadth of the mirror in which the whole object will appear, at the same distance with the eye.

Hence, also, as the length and breadth of the reflecting part of the speculum are subdupla of those of the object to be reflected; the reflecting part of the mirror is to the surface reflected in a subquadruple ratio. Consequently, the reflecting portion being a constant quantity, if in any place you see the whole body in a mirror, you will see it in every other place, whether you approach nearer or recede farther from it.

7. If an object AB (fig. 6.) be parallel to the mirror $I F$; the length of the reflected line AB is to the reflecting part of the speculum CD as the sum of the incident and reflected rays $B D + D O$ to the reflected ray $O D$; or as the sum of the distances of the eye and of the object from the speculum, *viz.* $O I + B F$ to the distance of the eye $O I$. For $G E : C D :: O E : O D$; *i. e.* because $G E = A B$, and $D E = D B$. $A B : C D :: O D + D B : O D$. Moreover, $O E : O D :: O K : O I$, therefore $G E : C D :: O K : O I$; consequently, since $I K = F E = B F$, and $G E = A B$, we shall have $A B : C D :: O I + B F : O I$.

8. A spectator will see his own image as far beyond the speculum as he is before it; and as he moves to or from the speculum, his image will, at the same time, move towards or from him on the other side, but apparently with a double velocity, because the two motions are equal and contrary. In like manner, if while the spectator is at rest, an object be in motion, its image behind the speculum will be seen to move at the same rate. And if the spectator moves, the images of objects that are at rest will appear to approach or recede from him, after the same manner as when he moves towards real objects.

9. If several mirrors, or several fragments or pieces of a mirror, be all disposed in the same place, they will only exhibit an object once.

10. If two plane mirrors, or specula, meet in any angle, the eye, placed within that angle, will see the image of an object placed within the same, as often repeated as there may be cathecti drawn determining the places of the images, and terminated without the angle.

Hence, as the more cathecti, terminated without the angle, may be drawn as the angle is more acute; the acuter the angle, the more numerous the images. Thus *Z. Traber* found, at an angle of one-third of a circle, the image was represented twice, at $\frac{1}{3}$ thrice, at $\frac{1}{4}$ five times, and at $\frac{1}{7}$ eleven times.

Farther, if the mirrors be placed upright, and so contracted; or if you retire from them, or approach to them, till the images reflected by them coalesce, or run into one, they will appear monstrously distorted: thus, if they be at an angle somewhat greater than a right one, the image of your face will appear with only one eye; if the angle be less than a right one, you will see three eyes, two noses, two mouths, &c. At an angle still less, the body will have two heads. At an angle somewhat greater than a right one, at the distance of four feet, the body will be headless, &c. Again, if the mirrors be placed, the one parallel to the horizon, the other inclined to it, or declined from it, it is easy to perceive that the images will be still more romantic. Thus, one being declined from the horizon to an angle of 144 degrees, and the other inclined to it, a man sees himself standing with his head to another's feet.

Hence it appears, how mirrors may be managed in gardens, &c. so as to convert the images of those near them into monsters of various kinds; and since glass mirrors will reflect the image of a lucid object twice or thrice, if a candle, &c. be placed in the angle between two mirrors, it will be multiplied an infinite number of times. On these principles are founded various catoptric machines, some of which represent objects infinitely multiplied and distorted; others infinitely magnified, and set at vast distances.

MIRRORS, *Burning.* See *BURNING-Glass.*

MIRRORS, *Convex,* are those whose surface is convex.

Note, by *convex* surfaces, authors generally mean such as are *spherically convex.*

Manner of preparing or making convex Specula, or Mirrors.

—There are various methods used by divers artists; particularly as to the matter or composition for the silvering. One of the best that is known is given us by *Wolffius*, thus:

Melt one part of tin, another of bismuth, together; and to the melted mass add two parts of mercury: as soon as the mercury begins to evaporate into smoke (which it presently does), the whole compost is to be thrown into cold water, and when well cooled the water decanted off. The mixture is then to be strained through a linen cloth two or threefold; and what is thus separated, poured into the cavity of a glass sphere: this sphere is to be turned gently round its axis till the whole surface is covered, the rest being reserved for future use.

If the sphere were of coloured glass, the mirror will be so too. And in the same manner may conic, elliptic, cylindrical, and other mirrors, be made.

How they may be made of metal, see under *Concave MIRROR.* See also *SPECULUM.*

MIRRORS, *Laws or Phenomena of Convex.* 1. In a spherical convex mirror $H C I$ (fig. 7.), the reflected ray $E M$

concur with the cathetus of incidence DL , and the incident ray DN with the cathetus of reflection EL , between the tangent AB , and the centre L . For the perpendiculars, or catheti of incidence, obliquation, and reflection, are in the plane of reflection, and, therefore, in the plane which touches the speculum in the point of incidence C ; the tangent AC makes a right angle with the cathetus of obliquation FC ; but the reflected ray EC , or CM , makes with it an acute angle u , and, therefore, falls between the tangent AC , and the cathetus of obliquation CL . Wherefore, since CL and DL meet in the centre L , the reflected ray EM ought to intersect the cathetus of incidence DL between the tangent and the centre. In the same manner it is shewn, that the incident ray DN ought to meet with the cathetus of reflection between the tangent and the centre. Hence, the image of a radiant point appears between the centre and the tangent, because it appears in the concurrence of the reflected ray and cathetus of incidence.

2. In a spherical convex mirror, the cathetus of incidence DL (*fig. 7.*) is to DB , the distance of the object from the tangent at the point of reflection C , as LM , the distance of the image from the centre, is to MP , the distance of the image from the tangent. Since $o = x$, and $r = m$, o will be equal to m , and, therefore, the right line CP bisecting the angle DCM , cuts the base DM into two parts, which are in the same proportion with the sides; consequently, $DP : PM :: DC : CM$; and if DF be drawn parallel to CM , u will be $= \beta$, and, as $u = y$, $\beta = y$, and $DF = DC$. Therefore, since $DF (DC) : MC :: DL : ML$, DL will be to $ML :: DP : PM$; and, therefore, $DL : DP :: ML : PM$. Hence, because $DL > DP$, and $ML > PM$; and, therefore, ML much greater than PM , the distance of the image from the centre is greater, but from the tangent less than half the semidiameter; and the image is nearer to the tangent than the centre.

Hence, also, the distance of the object from the tangent is greater than that of the image, and, consequently, the object is farther distant from the speculum than the image.

3. If the arc BD (*fig. 8.*) intercepted between the point of incidence D , and the cathetus AB ; or the angle C , formed in the centre of the mirror by the cathetus of incidence AC , and that of obliquation FC , be double the angle of incidence, the image B will appear on the surface of the speculum.

4. If the arc intercepted between the point of incidence and the cathetus; or the angle C , formed in the centre of the mirror by the cathetus of incidence, and the cathetus of obliquation, be more than double the angle of incidence, the image will be without the mirror.

5. If the arc intercepted between the point of incidence, and the cathetus; or the angle, formed in the centre of the mirror by the cathetus of incidence, and that of obliquation, be less than double the angle of incidence, the image will appear within the speculum.

6. In a convex mirror, a remoter point A (*fig. 9.*) is reflected from a point F , nearer the eye O , than any nearer point B in the same cathetus of incidence.

Hence, if the point of the object A be reflected from the point of the mirror F , and the point of the object B from the point of the mirror E ; all the intermediate points between A and B will be reflected from the intermediate points of the speculum between F and E ; and, consequently, FE will be the line that reflects AB .

Hence, also, a point of the cathetus B seems at a greater distance Cb from the centre C , than a more remote one, A .

7. A nearer point B (*fig. 10.*) not in the same cathetus with a remoter H , is reflected to the eye O , from a nearer point of the speculum, than the remoter H .

Hence, if the point of an object A be reflected from the point of a mirror C , and the point of the object B from the point of the speculum D , all upon the same point O ; all the intermediate points between A and B will be reflected from all the intermediate points between C and D . Consequently, the image FG of the object BA is contained between the cathetus BE and AE .

8. In a spherical convex mirror the image is less than the object.

And hence the use of such mirrors in the art of painting, where objects are to be represented less than the life.

9. In a convex mirror, the more remote the object the less its image; and, again, the smaller the mirror the less the image.

10. In a convex mirror, the right hand is turned to the left, and the left to the right; and magnitudes perpendicular to the mirror appear inverted.

11. The image of a right line, perpendicular to the mirror, is a right line; but that of a right line either oblique to the mirror, or parallel to it, is convex.

12. Rays reflected from a convex mirror diverge more than if reflected from a plane mirror.

Hence light, by being reflected from a spherical mirror, is weakened; and, consequently, the effects of reflected light are weaker than those of direct. Hence, also, myopes see remote objects more distinctly in a convex mirror, than they do directly.

Rays reflected from a convex mirror of a smaller sphere diverge more than those reflected from a larger. Consequently, the sight is more weakened, and its effects are less considerable in the former case than in the latter.

MIRRORS, *Concave*, are those whose surface is concave. These are generally made of a mixed metal.

Note, by *concave*, authors commonly mean *spherically concave*.

MIRRORS, *Manner of preparing or making Concave*. First, a mould is to be provided for casting them. In order to this, take clay well dried, pulverize and sift it; mix it up with water, and then strain or filter it; with this work up horse-dung, and hair shred small, till the mass be sufficiently tough; to which, on occasion, may be added charcoal-dust, or brick-dust, well sifted.

Two coarse moulds are then prepared of a gritty stone, the one concave the other convex; which are to be ground by one another with wet sand between, till such time as the one perfectly fits the other. By this means, a perfect spherical figure is acquired.

The mass, prepared before, is now to be extended on a table, by means of a wooden roller, till it be of a thickness proper for the mirror; and then being strewed with brick-dust to prevent its sticking, it is laid over the convex mould, and so gets the figure of the mirror. When this is dry, it is covered with another lay of the same mass; which once dried, both the covers, or segments of the clay, are taken off. The innermost of the two being laid aside, the stone mould is anointed with a pigment prepared of chalk and milk, and the outer cover again put over it.

Lastly, the joining being covered over with the same clay of which the cover is formed, the whole mould is bound together with an iron wire, and two holes are cut through the cover, the one for the melted matter of the mirror to be poured through, the other for the air to escape at, to prevent the mirror's being spoiled with bubbles.

The mould being thus prepared, eight parts of copper, one

one of English tin, and five of bismuth, are melted together; a little of the mixture is taken out with a ladle, and if it be too red, when cold, more tin is put in; if too white, more copper; the mass is then poured into the mould before prepared, and so assumes the figure of a mirror.

Some with ten parts of copper mix four of English tin, and a little antimony and sal ammoniac, stirring the mass about a long time any fumes arise in it: others have other compositions, many of which are described by Schottus and Zahnus.

The mirror, being thus cast, is cemented to a wooden frame, and thus worked to and fro over the convex side of the mould, first with water and sand, and, lastly, without sand till it be fit for polishing; the same mould is then covered with paper, and that is smeared over with tripoli dust, and calx of tin, over which the mirror is worked to and fro till it has got a perfect polish. And in the same manner are glass mirrors polished, excepting that the convex surface is there worked in the concave mould. When the mirrors are very large, they are fixed on a table, and first ground with a gritty stone, then with pumice, then with fine sand, by means of a glass cemented to a wooden frame; and, lastly, they are rubbed with calx of tin, and tripoli dust, on a wet leather.

For concave mirrors of glass, the mould is usually made of alabaster; the rest is as in metal mirrors. See SPECULUM, GRINDING, and POLISHING.

MIRRORS, *Laws and Phenomena of Concave.* 1. If a ray, as KI (fig. 11.), fall on a concave mirror EI , under an inclination of 60 degrees, and parallel to the axis AB , the reflected ray IB will concur with the axis AB , in the pole of the glass B . Since $m = 60^\circ$, n also will be $= 60^\circ$, and because KI is parallel to the axis AB , $i = 60^\circ$, and $u = 60^\circ$; therefore $CB = CI$, the radius. Consequently the point B , in which the reflected ray IB concurs with the axis, is in the surface of the speculum. If the inclination of the incident ray be less than 60 degrees, as that of EH , the reflected ray EF will concur with the axis at the distance BF , which is less than a fourth part of the diameter. Since $o = x$, and, on account of the parallels HE and AB , $o = y$, we shall have $x = y$, and, therefore, $EF = FC$; but $CF + EF > EC$, and $CE = CB$; therefore $CF + EF > CB$; consequently $CF > FB$; *i. e.* FB is less than half the radius CB , or a fourth part of the diameter. And, universally, the distance of the point F , in which the ray HE concurs with the axis, from the centre C , is to half the radius CD in the ratio of the whole sine, to the cosine of inclination. For by the last demonstration it appears, that FE is $= FC$; therefore if from F a perpendicular FD be let fall on EC , LC will be $= \frac{1}{2} CE$; but if CF be taken for the whole sine, CD will be the sine of the angle DFC , or the cosine of the angle DCF ; *i. e.* of the inclination DEH ; and, therefore, CF is to CD as the whole sine is to the cosine of the inclination.

Hence it is inferred, by calculation, that in a concave spherical mirror, whose breadth subtends an angle of six degrees, parallel rays meet, after reflection, in a part of the axis less than the one thousand four hundred fifty-seventh part of the radius; if the breadth of the concave mirror be 12, 18, 24, 30, 36 degrees; the part of the axis in which the parallel rays meet, after reflection, is less than $\frac{1}{363}$, $\frac{1}{106}$, $\frac{1}{56}$, $\frac{1}{37}$, $\frac{1}{26}$, the radius.

And on this principle it is, that burning glasses are formed.

For since the rays diffused through the whole surface of the concave mirror, after reflection, are contracted into a very small compass, the light and heat of the parallel rays

must be prodigiously increased thereby; *viz.* in a duplicate ratio of the breadth of the mirror, and the diameter of the circle in which all the rays are collected; and hence the sun's rays are, as to any purposes on earth, parallel to us, wonder that concave mirrors should burn with so much violence.

From this same principle is likewise deduced a method of representing the images of objects in a dark room; which see under CAMERA *obscura*.

2. A lucid body being placed in the focus F , of a concave mirror EI (fig. 12.), the rays, after reflection, become parallel. For parallel rays are by reflection united to a focus; but if the luminous body b be in the focus F , that which was before the reflected ray IF will be now the incident ray, and *vice versa*; therefore the reflected ray IE will now become parallel to the axis AB , and all the reflected rays parallel to one another.

Hence an intense light may be projected to a vast distance, by a lighted candle, &c. placed in the focus of a concave mirror.

Hence also, if the parallel rays be received by another concave mirror, they will again concur in its focus, and burn.

Zahnus mentions an experiment of this kind made at Vienna, where two concave mirrors, the one six, the other three feet diameter, being placed about twenty-four feet apart, with a live coal in the focus of the one, and a match and tinder in the other, the rays of the coal lighted the tinder.

3. If a lucid body be placed between the focus F (fig. 13.) and the mirror HBC , the rays, after reflection, will diverge from the axis BA . If the lucid body were in F , the reflected ray CE would be parallel to the axis AB , and, therefore, it would constantly preserve the same distance from the axis. But since $DCG > FCG$, KCG will be $> ECG$; and, therefore, CK will fall beyond CE , and cannot be parallel to the axis, but must continually diverge from the axis, the distance from it increasing; whence it follows, that light is weakened by reflection.

4. If a lucid body be placed between the focus F , and the centre G , as in I , the rays, after reflection, will meet in the axis beyond the centre. In this case $IHG < FHG$, and, therefore, $GHA < GHL$; consequently, the reflected ray HA recedes from the parallel towards the axis, and its distance from the axis will be continually diminished, till at length it concurs with the axis. But if the lucid body be placed in A , that which was before the reflected ray AH will now become the incident ray, and *vice versa*. If, therefore, the lucid body be placed beyond the centre G , the rays after reflection will concur with the axis between the focus F and centre G .

Hence, if a candle be placed in I , the image will appear in A ; if it be placed in A , its image will be in I : in the intermediate points between I and A , the section of light will be a circle; and that so much the greater, as it is nearer the point of concurrence.

5. If a luminous body be placed in the centre of the mirror, all the rays will be reflected back upon themselves; for as they fall perpendicularly on the speculum, they will be reflected into themselves.

Hence, if the eye be placed in the centre of a concave mirror, it will see nothing but itself, and that confusedly through the whole mirror.

6. If a ray falling from the point of the cathetus b (fig. 14.) on the convex mirror bF , be, together with its reflex IF , continued within the concavity of the mirror, FH will be the incident ray from the point of the cathetus H , and FO its reflex. For $bFE = IFM$; but $bFE = M$

$= M F O$, and $I F M = E F H$; therefore $M F O = E F H$; and, consequently, if $H F$ be taken for the incident ray from the point H , $F O$ will be the reflected ray.

Hence, since the point of the cathetus H is the image of the point h in the convex mirror, but the point h the image of H in the concave; if the image of an object, reflected by a convex speculum, be seen by a reflection made in its concavity, it will appear like the object itself.

And since the image of an infinite cathetus is less in a convex glass than one-fourth of its diameter; a portion of the cathetus, less than a fourth part of the diameter, may appear of any magnitude required in a concave one. A point, therefore, distant from a concave speculum less than one-fourth of the diameter, must appear behind the mirror at any distance, how great soever.

Since the image of any object, how broad soever, is contained in a convex speculum, between the two lines of incidence of its extreme points; if an object be placed between the two lines, at a distance less than one-fourth of its diameter, the breadth of the image, how great soever, may all appear.

Since then the image of an object included between two lines, at a distance less than one-fourth of the diameter, may exceed the just height and breadth of the object; nay, may be made of any magnitude, how big soever; objects placed between the focus and mirror must appear of enormous magnitudes in concave mirrors; the image being so much the greater in the concave mirror, as it is less in the convex.

In a convex mirror, the image of a remote object appears nearer the centre than that of a nearer object: therefore, in a concave mirror, the image of an object remote from the mirror appears at a greater distance than that of a nearer object, provided the distance of the object from the centre be less than a fourth part of the diameter.

In a convex speculum, the image of a remote object is less than that of a near one: therefore, in a concave one, the image of an object placed between the focus and the mirror, is nearer the focus than the speculum.

The image, therefore, of an object receding continually from a concave speculum, becomes continually greater, provided it do not recede beyond the focus, where it becomes confused; and as it approaches, it grows continually less. In a convex speculum, if the sphere, of which it is a segment, be smaller, the image is smaller than in another of a larger sphere: therefore in a concave, if the sphere, of which it is a segment, be smaller, the image will be larger than in another whose sphere is larger: whence concave mirrors, if they be segments of very small spheres, will do the office of microscopes.

7. If an object $A B$ (*fig. 15.*) be placed between a concave mirror and its focus, its image will appear behind the mirror in an inverted situation. Let $A B$ be the length of the object: since the point A is seen in the cathetus $C a$, and the point B in the cathetus $C b$, the higher point is seen in the higher place a , and the lower in the lower b ; or the object appears behind the mirror in an erect situation. But if $A B$ represent the breadth of the object, it appears in the same manner that the part to the right corresponds with the right, and the left to the left, both of the object and image. However, in direct vision the right hand part of an object corresponds to the left of the spectator, and the left to the right; and, therefore, in a concave speculum, the parts to the left hand of an object between the focus and speculum appear to the right, and the right to the left.

8. If an object $A B$ (*fig. 16.*) be placed between the focus and the centre, its image $E F$ will appear inverted, and in the open air, beyond the centre, the eye being placed

beyond the centre. For the rays, by which the point A is reflected, concur in the cathetus $G F$, beyond the centre C in F , and those by which the point B is reflected, concur in the cathetus $D F$, beyond the centre C in E ; therefore the point B radiates on the eye placed beyond $E F$ as from E , and the point A as from F ; consequently B is seen in E , and A in F , and the image of the object is seen beyond the centre in an inverted position. 9. If an object $E F$ be placed beyond the centre C , and the eye likewise beyond the centre, the image will appear inverted in the open air, between the centre and the focus. Hence, the inverted images of objects placed beyond the centre, are reflected by a concave mirror, erect; and may be received on a paper applied between the centre and the focus, especially if the room be dark; if the object $E F$ be farther distant from the centre than the focus, the image will be less than the object; because $A C$ is less than $E C$, and, therefore, $A B < E F$.

On this principle, concave mirrors, especially those which are segments of large spheres, and are capable of reflecting entire objects, exhibit many pleasing phenomena. Thus, if a man flourish his sword against the mirror, another comes out of it, and meets him with the same motions; and the image of his head coming out of the mirror, if he strike with his real sword, the imaginary sword will strike his real head. If he stretch out his hand, another hand will be stretched out of the mirror, and meet it at a great distance in the open air, &c. And on the same principle are constructed catoptric cistulae, which, when looked into, exhibit images much bigger than the chest. See CATOPTRIC CISTULA.

10. The image of a right line, perpendicular to a concave mirror, is a right line; but all oblique or parallel lines are concave. For since every point of a line perpendicular to the speculum is in the cathetus of incidence, its image will of course be a right line. But if $A B$ (*fig. 15.*) be parallel, or oblique to the speculum, and $C F$ be drawn from the centre C perpendicular to $A B$, $C A$ will be greater than $C D$; and, therefore, as $C F = C E$, $F D > A E$; consequently the point D will appear farther behind the speculum than A . Therefore, since c is farther distant from D , than a from A , and b from B , the image $a c b$ will appear concave.

MIRRORS, *Cylindrical, Conical, Parabolical, and Elliptical*, or specula, are those terminated by a surface respectively cylindrical, conical, parabolical, and spheroidal.

To prepare, or make, *cylindrical, conical, parabolical, elliptical, and hyperbolical Mirrors.*—For the *cylindrical and conical* sort, if they are to be of glass, the method of preparing them is the same as that already laid down for convex mirrors.

If of metal, they are to be made after the manner of concave mirrors, only that the clay moulds there described require other wooden ones of the figure of the mirror.

For *elliptical, parabolical, and hyperbolical* mirrors, the mould is to be thus prepared. On a wooden or brazen plane or table, describe the figure of an ellipse $A B$ (*fig. 17.*) a parabola, or an hyperbola, $C D$ (*fig. 18.*) after the manner taught under those heads; which done, cut out the figure from the plane with all the accuracy imaginable.

To the elliptic figure fit an axis, as $E F$, with two fulcra to sustain it, &c. and a handle to move it; lay a quantity of the clay, above described, under it; and turn about the axis by the handle, till the plane $A B$ hath turned, or impressed the elliptical figure exactly upon it.

The axis of the parabolical or hyperbolical figure $C D$, is to be fixed at the vertex E in such a manner as that it may

may always remain erect; this is to be turned about as above, till it hath given its own figure to the clay applied about it. The part of the mould, thus formed, is to be dried, and either smeared over with fat, or sprinkled with brickdust; then a convex mould is to be made, by putting a quantity of the same clay into the cavity thus formed. This latter is called the *male*, as the former the *female* mould. The male mould, being well dried, is to be applied within the female, in such a manner, as only to leave the intended thickness of the mirror between them. The rest as for concave mirrors.

These mirrors are not made without the utmost difficulty; because, if the moulds be ever so just, the figure of the mirror is apt to be damaged in the grinding. See SPECULUM.

MIRRORS, *Phenomena, or Properties of Cylindrical.* 1. The dimensions of objects corresponding lengthwise to the mirror are not much enlarged; but those corresponding breadthwise have their figures altered, and their dimensions lessened so much the more, as they are farther from the mirror; whence arises a very great distortion.

2. If the plane of reflection cut the cylindrical mirror through the axis, the reflection is performed in the same manner as in a plane mirror; if it cut it parallel to the base, the reflection happens in the same manner as in a spherical mirror; if, lastly, it cut it obliquely, or be oblique to its base, the reflection is the same as in an elliptical mirror. Hence, as the plane of reflection never passes through the axis of the mirror, except when the eye and objective line are in the same plane; nor parallel to the base, except when the radiant point and the eye are at the same height, the reflection, in a cylindrical mirror, is usually the same as in an elliptical one.

3. If a hollow cylindrical mirror be opposed directly to the sun, instead of a focus of a point, the rays will be reflected into a lucid line, parallel to its axis, at a distance somewhat less than a fourth part of its diameter.

Hence arises a method of drawing anamorphoses, *i. e.* wild, deformed figures, on a plane, which appear beautiful and well proportioned, when viewed in a cylindrical mirror.

MIRRORS, *as for Elliptic, Parabolic, Conic, and Pyramidal,* we are not much acquainted with their properties: only that in the first, if a ray strike on it from one of its focuses, it is reflected into the other; so that a lighted candle being placed in one, its light will be collected in the other. That the second, inasmuch as all the rays they reflect meet in one point, make the best burning-glasses of all others.

And, lastly, that wild, irregular figures, may be so drawn on a plane, as that, the eye being placed over the axis of the two last, they shall appear beautiful, and well proportioned. (See ANAMORPHOSIS.) For further particulars respecting the theory, materials, construction, and use of mirrors, see GLASS, GRINDING, LENS, MICROSCOPE, SPECULUM, and TELESCOPE.

MIRSERAI, in *Geography*, a town of Persia, in Khorasan; 12 miles W. of Sebzar.

MIRZAGUNGE, a town of Hindoostan, in Bengal; 27 miles S.S.E. of Mahmudpour.

MIRZAPOUR, a town of Hindoostan, in Bengal; 75 miles S.S.E. of Mahmudpour.—Also, a town of Hindoostan, in Bengal: 12 miles S.W. of Kithenagur.—Also, a town of Hindoostan, in Oude; 33 miles N.E. of Kairabad.—Also, a town of Hindoostan, in Allahabad; 41 miles S.E. of Allahabad. N. lat. 25° 10'. E. long. 82° 49'.

MIRZIN, or WOLCIN, a town of Moravia, in the circle of Iglau; 12 miles E. of Iglau.

MIS, a particle prefixed to divers words, particularly

law terms; denoting some default or defect. As, in *misprision*; *misdicere*, to scandalize one; *misdocere*, to teach amiss, &c.

MISA, in *Geography*, a river of Naples, which runs into the Adriatic, N. lat. 43° 43'. E. long. 13° 12'.

MISAGNO, a town of Naples, in the province of Otranto; seven miles S.W. of Brindisi.

MISANDRA, in *Botany*, Juss. 4-5, one of Comberford's fanciful names, the application of which is not very clear to us. It seems to imply that he was displeas'd at meeting every where with a superabundance of the male plants of this kind, in the straits of Magellan, and only once with the females, so that he was long unable to judge of the genus; at least this appears to be the conjecture of Jussieu. See GENERA.

MISANI, in *Geography*, a town in the island of Corsica; six miles W. of Cervione.

MISANTHROPY, *μισανθρωπία*, formed of *μισος*, *hatred*, and *ανθρωπος*, a man, a general dislike or aversion to man, and mankind. In which sense it stands opposed to *philanthropy*, or the love of mankind.

MISAPA, in *Geography*, a river of Mexico, which runs into the gulf of Mexico, N. lat. 18° 12'.

MISARA, a town of Egypt, on the left bank of the Nile; 12 miles S. of Melau.

MISADVENTURE, or MISADVENTURE, *Homicide by Law*. See HOMICIDE.

In the case of misadventure, the law presumes negligence, or at least a want of sufficient caution in him who was so unfortunate as to commit it; who, therefore, is not altogether faultless. The penalty inflicted by our laws is said by Sir Edward Coke to have been anciently no less than death; though others affirm, with greater reason, that it consisted in a forfeiture, as some say, of all the goods and chattels; according to others, of only part of them, by way of fine or wergild: which was probably disposed of, as in France, for pious uses, or for the benefit of the soul of the deceased. However, the delinquent has now, and has had as early as our records will reach, a pardon, and writ of restitution of his goods as a matter of course and right, only paying for suing out the same; and, to prevent this expence, in cases where the death has notoriously happened by misadventure, or in self-defence, the judges will usually permit, if not direct, a general verdict of acquittal. See HOMICIDE.

Stauford distinguishes between *aventure* and *misadventure*. The first he makes to be mere chance: as if a man, being upon or near the water, be taken with some sudden sickness, and so fall in, and be drowned; or into the fire, and be burnt.

Misadventure, according to him, is when a man comes to his death by some outward violence; as the fall of a tree, the running of a cart-wheel, the stroke of a horse, or the like.

MISCANELLO, in *Geography*, a town of Naples, in Basilicata; 26 miles S.E. of Potenza.

MISCARRIAGE, in *Midwifery*, the birth, or exclusion of a fœtus from the womb before it has attained its maturity.

By some writers, the word miscarriage is confined to deliveries, or births happening before the end of the sixth or seventh month, or before the child has acquired so much strength as to give it a chance of living. Children born in the eighth or early in the ninth month, are only said to have come before their time. (See ABORTION, and CONCEPTION.) The failure in an attempt to perform any thing is also called a miscarriage.

MISCELLANÆÆ, in *Botany*, a name given by Linnæus to the 54th of his Natural Orders, and which well expresses the heterogeneous nature of that order, as it stands at the end of his *Genera Plantarum*, where such various genera are brought together, that his leading idea in this assemblage can hardly be traced. They stand under eight heads, as follows.

1. *Refida, Datifca.*
2. *Poterium, Sanguiforba.*
3. *Pistia, Lemna.*
4. *Coriaria*; and *Empetrum* with a mark of doubt.
5. *Achyranthes, Celofia, Amaranthus, Irefine, Gomphrena, Phytolacca*
6. *Nymphæa, Sarracenia.*
7. *Cedrela, Swietenia.*
8. *Telephium.*

In the *Prælectiones in Ord. Nat. Plantarum*, published from the notes of Giseke and Fabricius, p. 594, this catalogue is much diminished, and the 54th order consists of only the first four of the above sections, without any remark or explanation.

The manuscript notes of Linnæus, to his own *Genera Plantarum*, here afford us some assistance. He has there referred the second section of the above list, very justly, to his 35th order, *Sciticeæ*, before *Agrimonia*.

The third section he removes to ord. 15, *Inundata*, which is but a slight improvement.

The fifth goes with great propriety to his *Holeraceæ*, ord. 12th.

The sixth to his *Rhœadææ*, ord. 27th, with a question whether the genera here mentioned be not more akin to *Afarum* and his 11th order, *Sarmentaceæ*; under which last however he has expressed a suspicion that *Arisfölochia, Afurum* and *Cytinus* may rather belong, with *Nymphæa*, to the 27th.

The seventh section he reduces to his *Tribilateæ*, ord. 23d, and *Telephium*, which alone makes the eighth, is removed to the *Holeraceæ*.

MISCELLANÆÆ is also the name of an order of the *Cryptogamia*, according to Schreber, in his *Gen. Pl.* 753. Under it he comprehends *Equisetum, Lycopodium, Porella, Salvinia, Marsilea, Pilularia*, and *Isetes*. These have little affinity, and the order can be considered merely as a receptacle for what could not well be placed elsewhere, as its name seems to imply.

MISCHARON, in *Geography*, a town of Persia, in the province of Irak; 111 miles S.E. of Hamadan.

MISCHIEF, *Malicious*, or *Damage*, in *Law*, is a species of injury to private property, which the law considers as a public crime. This is such as is done, not *animo furandi*, or with an intent of gaining by another's loss; but either out of a spirit of wanton cruelty, or diabolical revenge. Any damage arising from this mischievous disposition, though only a trespass at common law, is now by a multitude of statutes made penal in the highest degree. 22 Hen. VIII. c. 11. 43 Eliz. c. 13. 22 & 23 Car. II. c. 7. 4 & 5 W. & M. c. 23. 1 Ann. stat. 2. c. 9. and 4 Geo. I. c. 12. 12 Ann. stat. 2. c. 18. 1 Geo. I. c. 48. 6 Geo. I. c. 25. 9 Geo. I. c. 22. (See *BLACK AB.*) 6 Geo. II. c. 37. 10 Geo. II. c. 32. 28 Geo. II. c. 19. 6 Geo. III. c. 36. and 48. and 13 Geo. III. c. 33. 9 Geo. III. c. 29. 13 Geo. III. c. 38. See *FELONY*.

MISCHKA, in *Geography*, a river of Russia, in the country of the Cossacks, which runs into the Don, near Verchnei Tchirkovskaja.

MISCHKIN, a town of Russia, in the government of

Jaroslavl; 60 miles W. of Jaroslavl. N. lat. 58° 42'. E. long. 40° 22'.

MISCHNA, or MISINA, from מִשְׁנָה, *iteravit*, a part of the Jewish Talmud.

The Mischna contains the text; and the Gemara, which is the second part of the Talmud, contains the commentaries; so that the Gemara is, as it were, a glossary on the Mischna.

The Mischna consists of various traditions of the Jews, and of explanations of several passages of scripture; these traditions, serving as an explication of the written law, and supplement to it, are said to have been delivered to Moses during the time of his abode on the Mount; which he afterwards communicated to Aaron, Eleazer, and his servant Joshua. By these they were transmitted to the seventy elders, by them to the prophets, who communicated them to the men of the great sanhedrim, from whom the wise men of Jerusalem and Babylon received them. According to Prideaux's account, they passed from Jeremiah to Baruch, from him to Ezra, and from Ezra to the men of the great synagogue, the last of whom was Simon the Just; who delivered them to Antigonus of Socho; and from him they came down in regular succession to Simeon, who took our Saviour in his arms; Gamaliel, at whose feet Paul was educated, and last of all to Rabbi Judah the Holy, who committed them to writing in the Mischna. But Dr. Prideaux rejecting this Jewish fiction, observes, that after the death of Simon the Just, about two hundred and ninety-two years before Christ, the Mischnial doctors arose, who, by their comments and conclusions, added to the number of those traditions, which had been received and allowed by Ezra, and the men of the great synagogue; so that towards the middle of the second century, after Christ, under the empire of Antoninus Pius, it was found necessary to commit these traditions to writing; more especially as their country had considerably suffered under Adrian, and many of their schools had been dissolved, and their learned men cut off; and, therefore, the usual method of preserving their traditions had failed. Rabbi Judah, on this occasion, being rector of the school of Tiberias, and president of the sanhedrim in that place, undertook the work, and compiled it in six books, each consisting of several tracts, which altogether make up the number of sixty-three. (Prid. Connect. vol. ii. p. 468, &c. ed. 9.) This learned author computes that the Mischna was composed about the 150th year of our Lord; but Dr. Lightfoot says, that Rabbi Judah compiled the Mischna about the year of Christ 190, in the latter end of the reign of Commodus; or, as some compute, in the year of Christ 220. Dr. Lardner is of opinion that this work could not have been finished before the year 190, or later, and he thinks that it is placed soon enough at the year 180. (Collect. of Jewish and Heathen Testimonies, &c. vol. i. p. 178.) Others, however, apprehend, that the Mischna was not committed to writing till near the middle of the fifth century, alleging that St. Austin, who died in the year 430, says expressly (Cont. Advers. Leg. and Proph. lib. ii. c. 1.) that the Jewish traditions were not in writing. And yet that it was written before 500 seems evident, because in 548 Justinian interdicted the use of it in the synagogues. Kennicott's State of the Hebrew Text, vol. ii. p. 443.

Thus the book called the Mischna was formed; a book which the Jews have generally received with the greatest veneration. The original has been published, with a Latin translation, by Surenhufius, with notes of his own, and others from the learned Maimonides, &c. in 6 vols. folio, Amsterd. A.D. 1698—1703. See *TALMUD*.

It is written in a much purer style, and is not near so full of dreams and visions, as the Gemara.

MISCIANO, in *Geography*, a town of Naples, in the province of Otranto, 8 miles W.S.W. of Brindis.

MISCO, or MISKO. See MIXCO.

MISCONTINUANCE, in *Law*, the same with discontinuance.

MISCOPIHINS, in *Geography*, a small tribe of Indians who inhabit between lake Michigan and the Mississippi.

MISDEMEANOUR, or MISDEMISSION, in *Law*, an offence, or fault, particularly when in the execution of an office. See CRIME.

High crimes and misdemeanours denote offences of a heinous nature, next to high treason.

MISE, a French term, literally denoting expense, or disbursement: it is used in our law-books in divers acceptations. Sometimes for the profits of lands; sometimes for taxes, or tallages; and sometimes for expenses, or costs: as *pro misis & custodiis*, for colls and charges in the entries of judgments, &c.

Mise more peculiarly denotes an honorary gift, or customary present, with which the people of Wales used to salute every new king and prince of Wales, at their entrance upon the principality.

Anciently, the mise was given in cattle, wine, corn, &c. for the support of the prince's family; but when that dominion was annexed to the English crown, the gift was changed into money. The county of Flint paid two thousand marks, &c. for the mise.

The county of Cheshir also paid a mise or tribute of five thousand marks at the change of every owner of the said earldom, for enjoying the privilege of that palatinate. At Cheshir they have a mise-book, in which every town and village in the county is rated what to pay towards the mise.

Mise is also used in speaking of a writ of right. What in other actions is called an *issue*, in a writ of right is called a *mise* or *me*: so that *to join the mise upon the mere*, is as much as to say, to join issue on the mere right, *i. e.* to join upon this point, whether the tenant or demandant has the more right.

Yet even in a writ of right, if a collateral point be tried, it is there called an *issue*, not a *mise*. See ISSUE.

Mise is also sometimes used corruptly for *meuse*, a messuage or tenement.

In some manors, a *mise* or *meuse* place is taken for such a messuage or tenement as yields the lord an heriot at the death of the tenant.

MISELAR, in *Geography*, an island in the East Indian sea, of an irregular form, 18 miles long and five broad, near the W. coast of Sumatra. N. lat. 1° 28'. E. long. 97° 56'.

MISEN, MISSEN, or MIZEN, in a *Ship*, denotes either the mast, or sail of that name; but at sea, they always mean the sail when the word *mizen* is used.

This is the hindmost of the fixed sails of a ship, extended sometimes by a gaff, and sometimes by a yard, which crosses the mast obliquely; the fore-end reaching always down to the deck, and the after-end being pecked up as high above the middle of the yard, where it is attached to the mast. The figure of the mizen is a trapezium, or parallelogram, one of whose corners is cut off by a diagonal, extended from one of its sides to the opposite corner, which becomes the peck of the mizen. Some great ships require two mizens; in which case that next the main-mast is called the *main-mizen*, and that next the poop the *behaveventure mizen*.

The use of the mizen is, to keep the ship close to a wind; wherefore if a ship is apt to gripe too much, they use no mizen. But it is often used when a ship rides at anchor, to back her a-stern; so that she may not foul her anchor, on the

turning of the tide; and sometimes a ship lies a-try with her mizen only.

MIZEN *mast* is the mast upon which the mizen and its top-sail and stay-sails are supported, besides other sails, which are set occasionally, as the driver, ring-tail, &c. See MAST.

MIZEN, *Change the*, is an order to bring the mizen-yard over to the other side of the mast. *Peek the mizen*, *i. e.* put the mizen right up and down the mast.

MIZEN, *Set the*, at *Sea*, the word of command to fit the mizen-sail right as it should stand. *Spell the mizen*, *i. e.* let go the sheet, and peek it up.

MIZEN-*Ship*, in a *Ship*. See STAY.

MIZEN-Yard. See YARD.

MISENO, CAPE, in *Geography*, a cape on the N. side of the gulf of Naples. N. lat. 45° 48'. E. long. 13° 52'.

MISERE, a river of America, which runs into lake Superior, N. lat. 46° 14'. W. long. 89° 3'.

MISERERE, *have mercy*, the name, and first word of one of the penitential psalms; being that commonly given by the ordinary to such condemned malefactors as are allowed the benefit of the clergy: whence it is also called the *psalm of mercy*.

It is also the first word in the Latin translation of the 51st psalm, and has been elaborately set to music by all the great composers of the Romish church, from Palestrina to Jomelli and Haydn; but no miserere has been so celebrated as that composed by Gregorio Allegri, for the pontifical chapel at Rome, in 1629; which has continued to be solemnly and exquisitely performed there on Wednesday in Passion week, and on Good Friday. See ALLEGRI, JOMELLI, and Burney's Present State of Music in France and Italy.

MISERERE *Mei*, denotes a kind of colic, or disorder of the intestines, in which the excrements, instead of passing off the common way, are often thrown up by the mouth. The *miserere mei* is the same with what we otherwise call *volvulus*, and *iliac passion*.

MISERICORDE, CULTELLUM, in *Ancient Armour*, the name of the dagger, which was the constant companion of the sword, at least from the days of Edward I., and is mentioned in the statute of Winchester. Its appellation of misericorde is derived by Fauchet, the French antiquary, either from its being used to put persons out of their pain, who were irrecoverably wounded, or, from the sight of it causing those knights who were overthrown to cry out for quarter or mercy. After the invention of fire-arms, daggers were screwed into the muzzles of the muskets, to answer the present purpose of the bayonet.

MISERICORDIA, MERCY, in *Law*, an arbitrary amerceiement, or punishment imposed on any person for an offence.

Where the plaintiff or defendant in any action is amerced, the entry is always *ideo in misericordia*.

It is thus called, according to Fitzherbert, because it ought to be but small, and less than the offence, according to the tenor of Magna Charta.

"Multa lenior sic dicta, quod lenissima imponitur misericordia; gravior enim multas lines vocant; atrocissimas, redemptiones." See FINE and REDEMPTION.

Hence, if a man be unreasonably amerced in a court not of record, as a court baron, &c. there is a writ called *moderata misericordia*, directed to the lord, or his bailiff, commanding them to take moderate amerceiements.

MISERICORDIA *communis*, is when a fine is set on the whole county, or hundred.

MISERICORDIA *in cibus & potu*, in our *Old Writers*, is used for any gratuitous portion of meat and drink, given to the religious

ligious in convents beyond their ordinary allowance. (Matt. Paris.) And in some convents they had a slated allowance of these over-commons upon extraordinary days, which were called *miseri cordiæ regulares*.

MISERREPOUR, in *Geography*, a town of Hindooſtan, in Dooab; 15 miles N.W. of Etayah.

MISERY, an iſle between Salem and Cape Ann, in Maſſachuſetts.

MISFEASANCE, in *Law*, a miſdeed or treſpaſs. Whence alſo *miſfeafor*, a treſpaſſer.

MISFORTUNE. See CHANCE.

MISGUM, in *Ichthyology*, the name of a fiſh of the anguilliform kind, but broader and flatter than the eel, and of much the ſame ſize from the head to the tail; it has five black lines, one on the back, two, which are ſomewhat broader, in the middle of the ſides, and two others, which are narrower lower down; theſe are all extended from the head to the tail; the intermediate ſpaces, and the belly, are of a ſomewhat blueiſh-white, dotted with black ſpots; the fins are alſo ſpotted in the ſame manner; the mouth is ſmall and round like that of the lamprey, and is ſurrounded with beards, ſix on the upper jaw, and four on the under; and there are two other very ſlender ones near the noſtrils; the eyes are ſmall; the gills four on a ſide; and beſide the back fin there are four, two near the gills, and two lower on the body. This is a common fiſh about the German ſhores, and is eſteemed a very delicate one at the table; it lays its ſpawn in March, and is in beſt ſeaſon for eating in January and February. It is caught principally in ſtanding and muddy waters; and it is ſaid, that when out of water, it makes a ſort of hiſſing noiſe.

MISHNA. See MISCHNA.

MISIANO, in *Geography*, a town of Naples, in Calabria Ultra; 7 miles N. of Reggio.

MISILMARI, a town of Sicily, in the valley of Mazarà; 6 miles S.S.E. of Palermo.

MISITRA, the ancient *Sparta*, a town of European Turkey, in the Morea, defended by a caſtle on a rock, which is ſaid to be impregnable. The Chriſtians have ſeveral churches, one of which is reckoned the moſt beautiful in the world. The Jews have three ſynagogues, and the Turks have a ſuperb moſque and hoſpital. This town is the ſee of an archbiſhop, and the reſidence of a bey, an aga, and a waywode; and it contains 12,000 inhabitants. In 1770 it was taken by the Ruſſians; 40 miles S.S.W. of Argos. N. lat. 37° 10'. E. long. 22° 25'.

MISKERING, MISKERRING. See ABISHIERING.

MISKOTZ, in *Geography*, a town of Hungary; 30 miles W. of Tokay.

MISLAVA, a town of Hungary; 10 miles E. of Liſſebau.

MISLETOE. See MISTLETOE.

MISLIWECZEK, JOSEPH, in *Biography*, ſon of a miller in Bohemia, not far from Prague, a twin, born in 1737: the brothers reſembled each other ſo much, that their father was frequently uncertain to which of them he was ſpeaking. They were both brought up to the father's trade; but Joſeph in learning muſic at the common reading and writing ſchool, as all Bohemian children do, diſcovered uncommon genius and love for the art. And his father was ſcarcely dead before he quitted the miller's trade, and went to Prague, where he ſtudied muſic under the celebrated organiſt Segert with ſuch ſucceſs, that he ſhortly compoſed ſix ſymphonies, one each month, from January to June. Then, in 1763, he went to Venice, where he had leſſons from Piccette, and afterwards to Parma, where he compoſed his firſt opera, which ſucceeded ſo much, as to procure him a

call to Naples, where the opera of "Belerofonte" ſo eſta- bliſhed his reputation in Italy, that in the next ten years he brought nine operas on the ſtage; among which "Olimpiade," in 1778, was particularly admired, eſpecially the air, "Si circa ſi dice." Soon after the performance of Belerofonte, he went to Venice as a maſter, where he had been before only a ſcholar, and now was as well received as elſewhere. Then he removed to Pavia, and thence to Munich in 1779, and returned to Naples a ſecond time. About 1780, Fortune turned her back upon him: the opera of "Armida," which he ſet for Milan, was performed but once, in which almoſt every thing, except a bravura air for Marcheſi, was *ſſebiata* (hiſſed). Thence he went to Rome, where he had been un- fortunate before, and where he met with new diſgrace in 1781; in which city, after compoſing for different theatres of Italy 30 operas, beſides oratorios, and instrumental muſic of all kinds, he died, in 1782, in mortification and indigent circumſtances.

MISLOWITZ, in *Geography*, a town of Sileſia, in the lordſhip of Pleſz, on the borders of Poland; 32 miles W. of Cracow. N. lat. 50° 13'. E. long. 19° 5'.

MISNIA. See MEISSEN.

MISNOMER, compounded of *mis*, which in compo- ſition ſignifies *amiſs*, and *nomer*, to name, in *Law*, a wrong name, or the uſing of one name for another.

A miſnomer furniſhes one of the principal pleas in abate- ment.

MISOLOGIO, in *Geography*, a town of the Morea, in the paſhawite of Carnia, containing about 5000 in- habitants. It is ſituated on a ſwampy flat, ſcarcely above the level of the ſea. An extenſive ſhallow reaches along the coaſt for many miles, and is paled in for a meir, and kept in repair by the farmers of the fiſhery. This fiſhery was farmed in 1811 by forty perſons, who pay to the vizier Ali Paſhaw upwards of 3500*l.* ſterling. In Miſologio one of the prieſts teaches Greek, and the children, as in other parts of Greece, are taught writing, &c. by the parochial clergy. The inhabitants wear the Albanian dreſs, and though they grievouſly complain of the taxes, they admit the juſtice and vigour of Ali Paſhaw's government. The town has a ſmall fortification about two miles diſtant from the ſhore. The articles exported from Miſologio are ſimilar to thoſe which are uſually ſent from Patras and Lepanto. It has lately begun to ſend wool to Sicily, which wool is low priced, but not ſo inferior in quality as might be ſuppoſed from the rates at which it is ſold.

MISPACH, a town of Bavaria, in the lordſhip of Upper Waldeck; 27 miles S.S.E. of Munich.

MISPRISION, derived from the old French *meſpris*, a *neglect* or *contempt*, in *Law*, ſignifies a neglect or overſight, and is generally uſed to denote all ſuch high offences as are under the degree of capital, but nearly bordering upon them.

Miſpriſions are generally divided into two ſorts: negative, which conſiſt in the concealment of ſomething which ought to be revealed; and poſitive, which conſiſt in the commiſſion of ſomething which ought not to be done.

Miſpriſion of Clerks, is a neglect of clerks, in writing, or keeping records.

By the miſpriſion of clerks, no proceſs ſhall be annulled, or diſcontinued. And juſtices of aſſize ſhall amend the defaults of clerks miſ-ſpelling a ſyllable, or letter, in writing.

Miſpriſion of Felony, which is the concealment of a felony which a man knows, but never aſſented to, is puniſh- able, in a public officer, by ſtat. Weſtm. 1. 3 Ed. 1. c. 9. with imprifonment for a year and a day; in a common per- ſon

for with imprisonment for a less discretionary time; and in both with fine and ransom at the king's pleasure, declared by the judges in his courts of justice. Justices of the Common Pleas have a power to arrest any mercenaries upon persons offending by misprisions, contempts, or neglects, for not doing, or minding, any thing, in or concerning law.

MISPRISION of Treason, is a negligence in not revealing treason, where a person knows it to be committed.

It is enacted by Stat. 1 & 2 Ph. & Mar. c. 10 that a bare concealment of treason shall be only held a misprision; which concealment becomes criminal, if the party apprised of the treason does not, as soon as conveniently may be, reveal it to some judge of assize, or justice of the peace. (1 Hal. P. C. 372.) Besides, the statute 1 Eliz. c. 2. enact, that those who forge foreign coin, not current in this kingdom, their aiders, abettors, and procurers, shall all be guilty of misprision of treason. The punishment of misprision of treason is loss of the profits of lands during life, forfeiture of goods, and imprisonment during life. 1 Hal. P. C. 374.

The misprisions already recited belong to the class of those that are denominated negative. Misprisions, which are merely positive, are generally termed *contempts* or *high misdemeanours*. See **CONTEMPT**.

MISQUE Pocona, in *Geography*, a town of South America, in the viceroyalty of Buenos Ayres, and province of Santa Cruz de la Sierra; 100 miles S.S.W. of Santa Cruz.

MISQUI, a town of Peru; 60 miles N. of La Paz.

MISR *d'Attiké*, a town of Egypt, on the Nile, S. of Cairo, to which it is a kind of suburb.

MISS, a river of Carinthia, which runs into the Drave; five miles E. of Lavamand.

MISSA. See **MASS**.

MISSA *Pape Marcelli*, is the title of a celebrated mass in *Musick*, composed by Palestrina, and said to have prevented music from being banished the church. Concerning this production, it has been related by Antonio Liberati, in his famous letter to Ovidio Perfapeggi, and after him, by Adami, Bernardi, and other musical writers, that the pope and conclave having been offended and scandalized at the light and injudicious manner in which the mass had been long set and performed, determined to banish music in parts entirely from the church; but that Palestrina, at the age of twenty-six, during the short pontificate of Marcellus Cervinus, intreated his holiness to suspend the execution of his design till he had heard a mass, composed in what, according to his ideas, was the true ecclesiastical style. His request being granted, the composition, in six parts, was performed at Easter, 1555, before the pope and college of cardinals; who found it to grave, noble, elegant, learned, and pleasing, that music was restored to favour, and again established in the celebration of sacred rites. This mass was afterwards printed, and dedicated to the successor of Marcellus, pope Paul IV., by whom Palestrina was appointed maestro di cappella to the pontifical chapel.

The friends of choral music will doubtless be curious to have a faithful and minute account of a composition which had sufficient power to preserve their favourite art from disgrace and excommunication; and having before us an accurate score of it, which Signor Santarelli, the pope's maestro di capella, himself procured out of the archives of the Sistine chapel, where it is still performed, we can venture to assert, that it is the most simple of all Palestrina's works: no canon, inverted fugue, or complicated measures, have been attempted throughout the composition; the style is grave, the harmony pure, and by its facility the performer and hearer are equally exempted from trouble.

MISSEAL, *Misatit*, a mass ball, containing the several dances to be used on the several days, feasts, &c.

The Roman missal was first compiled by pope Gelasius, and afterwards reduced into better order by pope Gregory the Great; who called it the *book of sacraments*.

Each diocese, and each order of religious, have their particular missal, accommodated to the festivals of the province, or of the order.

MISSEALAND, in *Geography*, a river of Africa, which rises in Dar Far, and after a course of nearly 500 miles loses itself in the lake of Litré.

MISSEASAGA ISLAND, an island that lies opposite to the mouth of the river Trent in Upper Canada, and at the same distance from the portage at the head of the bay of Quinte.

MISSEASAGA River, a river of Upper Canada, which runs into lake Huron, between le Serpent and the Salmon rivers, on the N. shore. See **MISSASAGUELS**.

MISSEL BIRD, in *Ornithology*, the common English name of the larger species of thrush, called also the *skrite*, and by authors the *Turdus viscivorus major*; which see. It is much larger than any other of the thrush kind; its legs and feet are yellow; its head of a brownish lead colour, and its back, tail, and rump of the same colour, with an admixture of yellow; but in the summer months it a little changes its colour, and becomes more grey, or of the colour of unripe pickled olives; its throat, breast, and belly, are all variegated with black spots; the middle of its belly whitish, and the upper part of its breast, and part of its sides, and the under feathers of its tail, yellowish; its bill is shorter and thicker than that of other thrushes, and of a dusky colour, except the base of the lower mandible, which is yellow. It usually is seen on the top branches of tall oaks, elms, and other high trees, and sings very sweetly, and is the largest bird that has any melody in its note. It begins its song, sitting on the summit of a high tree, very early in the spring; often with the new year, in blowing showery weather, whence it is called in Hampshire the storm-cock; the note of anger or fear is very harsh, between a chatter and shriek. It remains the whole year with us, flies singly, except with its female, and drives all the lesser species of thrushes from it. It is the best of all the kinds for the table.

MISSELTOE. See **MISTLETOE**.

MISSEN-MAST, or **MIZZEN-Mast**. See **MISEN**.

MISSEN-Sail. See **MISEN**.

MISSIGUINIPI RIVER, in *Geography*, a river of Canada, which runs into the Saguenay, N. lat. 48° 22'. W. long. 71° 10'.

MISSILIA, among the Romans, a name given to largesses, thrown among the people on occasion of games and shows, such as small gold or silver coins, sweetmeats, and sometimes animals, as sheep, oxen, deer, &c. which were let loose to be carried off by the people.

The word comes from *mittere*, to throw, or let loose.

MISSIMA, in *Geography*, a town of Japan, in the island of Nippon.

MISSINABE LAKE, a lake of America, in Canada. N. lat. 48° 39' 42". W. long. 84° 2' 42".

MISSINABE House, a station belonging to the Hudson's bay Company, situated on the E. side of Moose river, and eight miles from Missinabe lake.

MISSING WOOD, a phrase used among *Bowlers*. See **BOWLING**.

MISSION, *Missio*, among the Romans, a term used to signify the emperor's sending to rescue a wounded gladiator from his antagonist. The *munerarii*, or persons who exhibited

bited the games, and likewise the people, used to rescue a favourite gladiator. The manner of their signifying this favour, was *pollice presso*, or with the thumb hid in the palm of the hand. However the gladiator was only saved for that time; whereas by the *rudis* he had a free discharge.

MISSION. See EMISSION, MANUMISSION, REMISSION, and TRANSMISSION.

MISSION, in *Theology*, denotes a power or commission to preach the gospel. Jesus Christ gave his disciples their mission in these words, "Go, and teach all nations, &c."

The Romanists reproach the Protestants, that their ministers have no mission; as not being authorized in the exercise of their ministry, either by an uninterrupted succession from the apostles, or by miracles, or by any extraordinary proof of a vocation.

Many among us deny any other mission necessary for the ministry, than the talents necessary to discharge it.

MISSION is also used for an establishment of people zealous for the glory of God, and the salvation of souls; who go and preach the gospel in remote countries and among infidels.

There are missions in the East as well as in the West Indies. Among the Romanists, the religious orders of St. Dominic, St. Francis, St. Augustine, and the Jesuits, have missions in the Levant, America, &c.

The Jesuits have also missions in China and all other parts of the globe, where they have been able to penetrate. The Mendicants abound in missions.

There have been also several Protestant missions, for diffusing the light of Christianity through the benighted regions of Asia and America. Of this kind has been the Danish mission, planned by Frederic IV., in 1706. And the liberality of private benefactors in our own country has been also extended to the support of missionaries among the Indians in America, &c.

MISSION is also the name of a congregation of priests and laymen, instituted by Vincent de Paul, and confirmed, in 1632, by pope Urban VIII., under the title of "Priests of the Congregation of the Mission."

These profess to make it their whole business to assist the poor people in the country; and to this purpose they oblige themselves never to preach, or administer any of the sacraments, in any town where there is an archbishop, bishop, or provincial residing.

The priests of the mission were also intrusted with the direction and government of a female order, called "Virgins of Love, or Daughters of Charity," whose office it was to administer assistance and relief to indigent persons, who were confined to their beds by sickness and infirmity. This order was founded by a noble virgin, whose name was Louise Gras, and received, in the year 1660, the approbation of pope Clement IX.

They are settled in most provinces of France, Italy, Germany, and in Poland. At Paris they have a seminary, which they call the *Foreign Mission*, where youth are bred up, and qualified for missions abroad.

MISSIONARY, an ecclesiastic who devotes himself and his labours to some mission, either for the instruction of the orthodox, the conviction of heretics, or the conversion of infidels.

MISSISSIPPI RIVER, in *Geography*, a river which by its various windings, from its confluence with Beau-bassin at the head of Chignat channel, to its main source, and from thence by a line due E. to the bay of Verte, in the straits of Northumberland, separates the provinces of Nova Scotia and New Brunswick.

MISSISSIPPI, a large river of America, which, toge-

ther with its eastern branches, waters $\frac{1}{3}$ ths of the United States, forms their western boundary, and separates them from Louisiana. It rises in White Bear lake, N. lat. $48^{\circ} 15'$. W. long. $98^{\circ} 30'$, and in its course receives several streams both from the E. and W., the largest of which are the Missouri from the W., and the Illinois, Ohio, and Tennessee from the E. The soil on both sides of this river, and in the vicinity of its tributary streams, is not inferior to any in North America. This river is navigable to St. Anthony's Falls, and, as some say, beyond them. Salt of excellent quality is produced from the salt-springs or licks that are contiguous to it, and on its upper branches are great quantities of coal. An island of considerable size is formed by its mouths in the gulf of Mexico, between 29° and 30° N. lat. and 89° and 90° W. long.

MISSISSIPPI Territory, a district formed of the western part of the state of, and bounded N. by Tennessee, W. by the Mississippi river, S. to W. by Florida, E. by the Appalachicola and Flint rivers. The principal part of this country is inhabited by the Creek, Choctaw, Chickasaw, and Cherokee nations of Indians. It was erected into a territorial government in 1800, and divided into three counties, *viz.* Washington, including 1250 inhabitants, Pickering with 2940, and Adams with 4660. The total number is 8850, of which 3489 are slaves. Natches is the capital. It is watered by many fine rivers, and contains large tracts of the best land in the United States.

MISSISSAGUIS, a tribe of Indians who inhabit the shores of lake Ontario, and one of the most numerous in this part of the country. The men are in general stout, and most excellent hunters and fishers; but less warlike than any of the neighbouring nations. They are of a darker complexion than other Indians; some of them being nearly as black as negroes. Both men and women, particularly the latter, are very dirty and slovenly in their appearance: the rancid grease and fish oil, with which the women daub their hair, necks, and faces, render them in a summer's day extremely offensive. These Indians supply the inhabitants of Kingston, of Niagara, and of the different towns on the lake, with fish and game, the value of which is estimated by bottles of brandy and loaves of bread.

MISSIVE, something sent to another, from the Latin word *mitto*, *I send*.

We say missive letters, or letters missive, meaning letters sent from one to another.

In propriety letters missive are letters of business, but not business of great concern; in contradistinction from letters of gallantry, letters on points of learning, dispatches, &c. See LETTERS.

MISSON, MAXIMILIAN, in *Biography*, a well known French writer, was a counsellor of Paris at the time of the revocation of Nantes, which circumstance obliged him to quit his country and come over to England. In 1687, and the following year, he travelled to Italy with an English gentleman, in the character of governor, and soon after his return he published the fruits of his observations, in a work entitled "Nouveau Voyage d'Italie," in 3 vols. 12mo. These travels were looked upon as a faithful and lively picture of the countries described, but the Catholics were offended at the representations given of the ceremonies and popular superstitions prevalent among them, which they charge with unfaithfulness and exaggeration. Misson wrote likewise "Memoires d'un Voyageur en Angleterre;" and "Le Theatre sacré des Cevennes, ou Recit des Prodiges arrivés dans cette Partie du Languedoc, et des petits Prophètes." He died, at an advanced age, in London, in the year 1721. Moreri.

MISSOURI,

MISSOURI, in *Geography*, a river of North America, in Louisiana, which falls into the Mississippi from the westward, 18 miles below the mouth of the Illinois, and about 116 miles from the Balize, or mouths of the Mississippi, in the gulf of Mexico. Hutchins says that it is navigable 1300 miles, and larger than the Mississippi.

MISSOURIS, the Indians who inhabit the banks of the above river, and who are said to have 1500 warriors.

MIST, a meteor, called also fog. See Fog and METEOROLOGY.

The bluish mist which we sometimes see on our fields and pastures in a morning, though often innocent, yet has been in some places found to be the actual cause of murrain, and other fatal diseases among the horned cattle. Dr. Winkler gives, in the Philosophical Transactions, an account of a murrain affecting the cattle in Italy and other places, which was evidently seen to spread itself over the countries in form of a blue mist. Wherever this was perceived, the cattle were sure to come home sick: they appeared dull and heavy, and refused their food; and many of them would die in four-and-twenty hours. Upon dissection there were found large and corrupted spleens, sphaclous and corroded tongues; and in some places those people who were not careful of themselves in the management of their cattle, were infected and died as fast themselves. The principal cause of this disease seems to be the exhalation of some unwholesome steams from the earth; and it was observable, that there had been three earthquakes in Italy the year before it happened.

The method of cure which succeeded best, was this: as soon as any beast appeared to be sick, they examined the tongue, and if apthæ or little blisters were found on it, they scraped it with a silver instrument made with sharp teeth at the sides, till it bled in all those parts where the apthæ were; the blood was then wiped away with a cloth, and the whole tongue washed several times with vinegar and salt. After this the following medicine was given internally: take of foot, brimstone, gunpowder, and salt, of each equal parts: mix these in as much water as will make a mixture thin enough to be swallowed, and let a spoonful be given for a dose three or four times a day. The cattle which were in health had this medicine given them, as well as the sick; and the consequence was, that very few died in Swisserland, while almost all died in other places.

It was very remarkable that this contagion, on this occasion, seemed to travel slowly but regularly on: it came at the rate of about two German miles in twenty-four hours; this it kept regularly to during the whole time of its raging, and never appeared in very distant places at the same time.

The whole surface of the earth emitting these effluvia, no cattle escaped them in the course of their way, but those which were kept within doors at rack and manger, fell ill at the same time, and in the same manner with those in the open fields.

Dr. Slare was of opinion, that it was owing to certain insects, which could not fly faster than at the rate of two German miles a day; and that they travelled regularly, and spread the mischief where they passed; but there wanted some judicious persons, versed in these observations, to have examined both the state of the air and the beasts, on this occasion. Phil. Trans. N^o 145.

MISTAKE BAY, in *Geography*, a large bay on the west side of the entrance of Davis's Straits, and N. of Hudson's Straits; from which it is separated by a peninsula of the N. main on the W. and Resolution island on the S.

MISTAKEN BAY, a bay on the N.W. coast of Tavai

Poenannoo, so called by Capt. Cook in 1769; 25 miles S.W. of Cascade Point.

MISTAKES Cape, the S. point of the easternmost of the Heron's islands, about three leagues E.N.E. from Cape Horn, at the extremity of South America.

MISTEK, a town of Moravia, in the circle of Prerau; 7 miles E.N.E. of Freyburg.

MISTELPACH, a town of Austria; 18 miles N. of Vienna.

MISTIC, or **MYSTIC**, a short river which falls into the N. side of Boston harbour, by a broad mouth on the E. side of the peninsula of Charlestown. It is navigable for sloops four miles to the town of Medford, and is crossed by two bridges, one at its mouth, and another a mile above it. The Middlesex canal connects this river with the Merrimack.

MISTISSINY, a lake of Canada. N. lat. 50° 40'. W. long 74°.

MISTLETOE, **MISLETOE**, or *Mistletoe*, in *Botany*. See VISCUM.

MISTRETTA, in *Geography*, a town of Sicily, in the valley of Demona; the see of a bishop; 64 miles W. of Messina. N. lat. 38° 55'. E. long. 14° 22'.

MISTY, a town of Asiatic Turkey, in Caramania; 50 miles S. of Yurcup.

MISUSER, in our *Old Writers*, an abuse of any liberty or benefit: as he shall make fine for his misuser. Old. Nat. Br. 149.

By misuser, a charter of a corporation may be forfeited; so also an office, &c.

MISWALDE, in *Geography*, a town of Prussia, in the province of Oberland; 18 miles S. of Elbing.

MISY, in *Natural History*, the name of a fossile substance, used very frequently by the ancients in medicine, and supposed to be one of their now lost medicines, but erroneously; it being still very common in the Turkish dominions, and not unfrequently found in the mines of Cremnitz in Hungary. It is a considerably firm substance, though of an irregular and seemingly not compact texture, and much resembles some of our gaudy marcasites; but that it wants their hardness and their weight, and is not inflammable.

It is at present no where put to any use. The ancients esteemed it of the same nature with the chalcitis, but that it possessed those virtues in a more remiss degree; they had it from Ægypt and Cyprus, and used it externally in hæmorrhages, and some cutaneous eruptions.

MISY, in *Botany, a name given by Theophrastus, and all the old Greek writers, to a kind of truffle or subterranean mushroom, of a very delicate flavour. The truffles of Numidia, and some other parts of Africa, were always esteemed superior to those of any other part of the world. They are called *terfez*, *camaba*, or *kema*, by some later writers, and were brought to Rome, and so greatly esteemed, that no dish was ranked above them. These were called Lybian truffles by the Romans, and they seem to have been the same with the Cyrenean misy of the Greeks. It is to be observed, that the Greeks in general, in early times, were very little acquainted with the affairs of Africa; and all that they had from this part of the world, was said to come from Cyrene, some old cities of their forefathers being there, and keeping up a friendship and traffic with them. The *thyon*, a tree growing plentifully in almost all parts of Africa, and which is the same with the citrus of the Romans, was in this manner attributed to Cyrene, by the same Theophrastus. And thus, when speaking of truffles, he adds, that the Cyrenean misy surpassed all the other kinds in flavour; his words stand at large in Athenæus; and thence Pliny has taken his account,*

account, which he closes in this manner: "The thing which they call misy, in the province of Cyrene, is of this kind; but it is more fleshy and of a finer taste and smell." This is the sense of Pliny, as the text stands in our copies; but it is probable that he translated Theophrastus better than they, at least as we know that what he says is not his own but taken from that author, we have a right to understand it in his way, and that is, that the roots of this Cyrenean misy have a delicate smell resembling that of meat, or flesh newly cut. Pliny, lib. xix. cap. 3.

It is very certain, that this Cyrenean misy of the old Greeks is the same thing with the delicate African truffe or terzez of Leo Africanus, and the moderns; and Pliny had read some of the ancients who were sensible of this, and had taken from them an account that the African truffes are the finest in the world; and yet did not perceive, that these African truffes were the same with the Cyrenean misy, which he immediately after mentions from Theophrastus.

MITCHEL DEAN, in *Geography*. See DEAN, Michel.

MITCHELLA, in *Botany*, named by Linneus in honour of his friend and correspondent Dr. John Mitchell, a physician at Virginia, whose paper, describing thirty new genera of plants, is published in the *Ephemerides Naturæ Curiosorum*, v. 8, 187, preceded by a dissertation on the principles of systematic botany and zoology. This treatise was afterwards published separately at Nuremberg in 1769, about a year after its author's death. Linn. Gen. 55. Schreb. 73. Willd. Sp. Pl. v. 1. 617. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 246. Michaux Boreali-Amer. v. 1. 86. Juss. 208. Lamarck Illustr. t. 63. (Chamædaphne; Mitchl. n. 27.)—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Aggregata*, Linn. *Rubiacea*, Juss.

Gen. Ch. *Cal.* Perianth superior, erect, four-toothed, permanent. *Cor.* of one petal, funnel-shaped; tube cylindrical; limb four-cleft, spreading, hairy within. *Stam.* Filaments four, thread-shaped, erect, between the segments of the corolla; anthers oblong, acute. *Pist.* Germen twin, inferior, orbiculate, common to two flowers; style thread-shaped, the length of the corolla; stigmas four, oblong. *Peric.* Berry divisible into two parts, globose, with two distinct crowns. *Seeds* four, compressed, callous.

Eff. Ch. Corolla of one petal, superior; two flowers on each germen. Stigmas four. Berry in two parts, with four seeds.

1. *M. repens*. Linn. Sp. Pl. 161. (*Syringa baccifera*; Plek. Amalth. 198. t. 444. f. 2.)—Native of North America, and introduced at Kew in 1761, by Mr. John Bartram, where it flowers in June. *Stem* decumbent and creeping, slender. *Leaves* in pairs, on short stalks, ovate, pointed. *Flowers* terminal, two on each germen, as in several of the genus *Lonicera*.

MITCHELS, among *Builders*, are Purbeck stones, from fifteen inches square to two feet, squared and hewed ready for paving.

MITCHELSTOWN, in *Geography*, a post-town of the county of Cork, Ireland, situated on the river Funcheon. In it is a college, founded by a former earl of Kington, for the support of twelve decayed gentlemen and twelve decayed gentlewomen, who have each 40*l.* per annum, and comfortable apartments; and a chaplain with 100*l.* per annum, with a house. A fine seat of the Kington family adjoins the town. Near this town, at the foot of one of the Gattee mountains, is the cave of Skeheenrinky, which is described by Arthur Young in his Irish Tour, and preferred by him to the famous cave in the Peak of Derbyshire, as it was by lord Kingborough to the Grot d'Ance in Burgundy. Mitchelstown is 102 miles S.W. from Dublin, and about

24 from Cork, on the road from that city to Cashel. Carlisle. Young.

MITCHIGAMAS, a nation of Indians, who with the Piorias, inhabit near the settlements in the Illinois country.

MITE, in *Natural History*, the name of a small animal very well known, and found in old cheese, and in many other bodies, both recent and perishing. See ACARUS.

To the naked eye the mites in cheese appear like moving particles of dust, but the microscope discovers them to be perfect animals, having as regular a figure, and performing all the functions of life as perfectly as creatures that exceed them many times in bulk.

They are crustaceous animals, and are usually transparent; the principal parts of them are the head, the neck, and the body; the head is small in proportion to the body, and has a sharp snout, and a mouth that opens and shuts like a mole's; they have two small eyes, and are extremely quick-sighted; and when you have once touched them with a pin, you will easily perceive how cunningly they avoid a second touch.

They are of different sorts; for some of them have six legs, and others have eight: each leg has six joints surrounded with hairs, and two little claws at the extremity, with which it very nicely takes hold of any thing; the hinder part of the body is plump and bulky, and ends in an oval form, from which there issue out a few exceeding long hairs; other parts of the body and head are also beset with thin and long hairs.

The males and females are easily distinguished in these little animals. The females are oviparous, as the louse and spider, and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are, however, when first hatched, extremely minute; and, in their growing to their full size, they cast their skins several times.

These little creatures may be kept alive many months between two concave glasses, and applied to the microscope at pleasure. They are thus often seen *in coitu*, conjoined tail to tail; and this is performed by an incredible swift motion.

Their eggs, in warm weather, hatch in twelve or fourteen days; but, in winter, they are much longer; these eggs are so small, that a regular computation shews, that ninety millions of them are not so large as a common pigeon's egg. Baker's Microscope, p. 18.

Mites are very voracious animals; they not only prey upon cheese, but upon all sorts of dry flesh, fish, fruits, and feeds; and almost on all things which have some degree of moisture, without ever being wet; and they have often been seen to eat one another. Their manner of eating is by thrusting alternately one jaw forward and the other backward; and in this manner grinding their food; and after they have done feeding, they seem to chew the cud.

There are several lesser distinctions observable in the mites, which are found among different substances. Those in malt-dust and oat-meal are much nimbler than the cheese-mites, and have more and longer hairs. The mites among figs resemble beetles, and have two feelers at the snout, and two very long horns over them; these have only six legs, and are more sluggish than those in malt-dust. Those found among figs have also very long hairs, and those beset at certain distances with other smaller hairs; whence M. Leeuwenhoek conjectures that these longer and larger hairs are jointed at those places where the short ones are found.

There is a sort of wandering mites found wherever there is any thing that they can feed on; these are often found in form of a white dust, and are not suspected to be living creatures.

The mitre is an animal very tenacious of life; it will live months without food; and M. Leeuwenhoek had one which lived eleven weeks on the point of a pin, on which he had fixed it, examining it by his microscope. Leeuwenhoek's Arcan. Nat. tom. iv. p. 368.

MITRE, a small coin, formerly current; equal to about one-third part of a farthing.

MITRE also denotes a small weight used by the miners. It is equal to the twentieth part of a gram troy, and is divided into twenty-four droits, the droit into twenty perots, and the perot into twenty-four blanks.

MITRELLA, in Botany, received its name from Tournefort, in allusion to the shape of the ripe seed-vessel, which, with its two pointed lobes, resembles a little mitre.—Linn. Gen. 123; Schreb. 301. Willd. Sp. Pl. v. 2. 659. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 73. Juss. 309. Tourn. t. 126. Michaux Boreali-Amer. v. 1. 270. Lamarck Illustr. t. 373. Gärtn. t. 44.—Class and order, *Decandria Digynia*. Nat. Ord. *Succulenta*, Linn. *Saxifrageae*. 107.

Gen. Ch. Cal. Perianth inferior, of one leaf, cut half way down into five segments, bell-shaped, permanent. Cor. Petals five, in many capillary segments, inserted into the calyx, twice exceeding it in length. Stam. Filaments ten, awl-shaped, inserted into the calyx, shorter than the corolla; anthers roundish. Pist. Germen superior, roundish, cloven; styles scarcely any; stigmas obtuse. Peric. Capsule ovate, of one cell, divided half way down into two flat, equal valves, recurved at their points. Seeds numerous.

Ess. Ch. Calyx five-cleft, inferior. Petals five, pinnatifid, inserted into the calyx. Capsule of one cell, with two equal valves.

1. *M. diphylla*. Two-leaved Mitella. Linn. Sp. Pl. 580. Lamarck, fig. 1. (*Cortusa americana altera floribus imbricatis fimbriatis*; Menz. Pugill. t. 10.)—Leaves heart-shaped, slightly three-lobed, toothed. Stalk with two opposite leaves.—Native of North America. Easily cultivated in bog earth, in the shade, flowering in April and May. A delicate little perennial herb, about a span high, pale green, somewhat hairy. Leaves heart-shaped, acute, slightly lobed and toothed; the radical ones several, on longish footstalks. Flower-stalk solitary, erect, bearing a pair of sessile, opposite horizontal leaves about the middle, and terminating in a slender, upright, downy, rather viscid cluster, of minute white flowers, remarkable for their elegantly fringed feather-like petals. Capsule sometimes with three valves.

2. *M. cordifolia*. Heart-leaved Mitella. Willd. n. 2. Lamarck, fig. 3.—Leaves heart-shaped, with bristly teeth. Stalk nearly naked.—Supposed by Willdenow, we know not on what foundation, to be a native of the north of Asia. Michaux found it in Canada. This appears to differ from the former in having sharper bristle-pointed teeth to the leaves, and only one very small leaf, with a few scales, on the stalk. Petals in capillary segments. We have seen no specimen.

3. *M. nuda*. Naked-stalked Mitella. Linn. Sp. Pl. 580. Lamarck, fig. 2. (*M. scapo nudo, petalis imbricatis*; Gmel. Sib. v. 4. 175. t. 63.)—Leaves kidney-shaped, wavy, fringed. Stalk naked.—Native of Siberia and North America, in woods. Miller is said to have cultivated this species in 1758, but we have never seen it in the gardens of the present day. It is smaller than the first species, with rounder, strongly bristly, leaves. Stalk three or four inches high, quite naked, bearing four or five flowers, the segments of whose petals are quite capillary.

4. *M. prostrata*. Prostrate Mitella. Michaux. n. 3.—

“Root creeping. Stems prostrate. Leaves alternate, roundish-heart-shaped, sharpish, with slight obtuse lobes.”—Native of the southern limits of Canada. Michaux.

MITRELLA, in Surgery, a feat for suspending the arm. MITGAING, in Geography, a town of Hindoostan, in the circle of Surgooja; 40 miles N. of Surgooja.

MITHRA, Feasts of, in Antiquity, were feasts celebrated among the Romans in honour of Mithra, Mithras, or the sun.

Mithras was an ancient god of the Persians, whom they worshipped, as Plutarch says, according to the laws of Zoroaster, invoking him as the mediator between Oromazes and Arimannus. Mithras was the sun, which was invoked as a divinity; to him they offered sacrifices, and addressed their prayers, and they had priests set apart for service; and they also worshipped fire as an emblem of the sun; but they had neither temples, statues, nor altars. This Mithras was not well known in Europe, until his worship was brought to Rome, which happened, according to Plutarch, in the time of the Piratic war, A. U. C. 687. It is from this epoch, and more especially from the time of the second and third century of the Christian era, that the worship and mysteries of this divinity were celebrated at Rome. That the Romans worshipped Mithras as the sun, is evident from an inscription dated in the third consulate of Trajan, or about the year of Christ 101. This is the dedication of an altar to the sun, under the name of *Mithra, deo Soli invictio Mithra*. This epithet, invincible, is frequently given to the sun upon other monuments, and it denotes that luminary to be the first and lord of all the rest. But the worship of Mithras was not known in Egypt and Syria in the time of Origen, who died about the year of Christ 263: though it was common at Rome for more than a century before this time. The mysteries of Mithras were both impious and abominable, since human victims were offered on this occasion. The barbarous custom of sacrificing men was abolished by Adrian, but restored again by Commodus, as Lampridius informs us. This worship made great progress in succeeding ages. It was not only spread through Italy and Greece; but it appears from Socrates and 8 women, that the Egyptians, and particularly the people of Alexandria, worshipped the same divinity. Mithras was also known in the island of Crete. He was also worshipped by the Gauls, as appears by a figure of this god found at Lyons. The worship of this divinity was not only extensive, but of long duration; for it was not destroyed when the emperors embraced Christianity. At length, this worship was proscribed at Rome in the year 378, by order of Gracchus, prefect of the prætorium. According to M. Freret, the feasts of Mithras were derived from Chaldea, where they had been instituted for celebrating the entrance of the sun into the sign Taurus.

MITHRA is also a name of the sun in the mythology of the Hindoos. See SURYA.

MITHRAX, in Natural History, the name given by Pliny and the ancients, to a gem found in Persia, which, when held up to the sun, shewed many colours. It was probably no other than the opal. Hence the barbarous writers of the middle ages seem to have taken their account of the mithridates.

MITHRIDATE, MITHRIDATIUM, in Pharmacy, an antidote or composition, in form of an electuary; serving either as a remedy, or a preservative against poisons. Mithridate was formerly one of the capital medicines in the apothecaries' shops, being composed of a vast number of drugs; among which are opium, myrrh, agaric, saffron, ginger, cinnamon, spikenard, frankincense, castor, pepper, gentian, &c.

It is accounted a cordial, opiate, sudorific, and alexipharmic. Matthioli says, it is more effectual against poisons than Venice treacle, and much easier to be made.

It takes its name from its inventor, Mithridates, king of Pontus, who is reported to have so fortified his body against poisons, with antidotes and preservatives, that when he had a mind to dispatch himself, he could not find any poison that would take effect.

The receipt of it was found in his cabinet, written with his own hand, and was carried to Rome by Pompey. It was translated into verse by Damocrates, a famous physician, and hence called *Confessio Damocratis*; and was afterwards translated by Galen, from whom we have it. It has undergone considerable alterations since the time of its royal prescriber.

MITHRIDATE Mustard. See TREACLE Mustard.

MITHRIDATE, *Mustard Bastard*, is a species of *iberis*.

MITHRIDATEA, in *Botany*, received its name from Commerçon, we presume in memory of Mithridates, who, from the celebrated hodge-podge, which he is reported to have invented, as a counter-poison, must have been conversant with herbs and their reputed properties at least. We can trace no reason for the application of the name to this particular plant.—Schreb 783. Willd. Sp. Pl. v. 1. 27. (Tambourissa; Sonnerat Ind. Or. v. 2. 237. Ambora; Juss. 401. Lamarck Illustr. t. 784.)—Class and order, *Monardria Monogynia*. Nat. Ord. *Scabride*, Linn. *Urticæ*, Juss.

Gen. Ch. *Common Receptacle* of one leaf, fleshy, bell-shaped, in four large, ovate, spreading segments; the upper surface covered with innumerable, minute, imbedded florets. *Perianth* scarcely any. *Cor.* none. *Stam.* Filament one, very short, erect; anther erect, channelled, embracing the style. *Pist.* Germen oval; style shorter than the stamen; stigma simple. *Peric* none. *Common Receptacle* enlarged, pulpy, turbinate, concave, its segments folded inward, lodging the seeds in its fleshy substance. *Seeds* solitary to each floret, oval.

Obs. Jussieu thinks the flowers are monoecious, the receptacles of the males being most deeply cut, and expanded, those of the females slightly perforated, by a cruciform incision, at the top. This seems to agree with our specimens from Commerçon, but by no means with Sonnerat's description. Possibly the flowers may become monoecious occasionally, by the casual imperfection of their respective organs.

Ess. Ch. *Common receptacle* many-flowered, four-cleft. Calyx none. Corolla none. Seeds solitary, imbedded in the fleshy receptacle.

1. *M. quadrifida*. Ambora, Drum-tree, or Monkey-apple.—Gathered by Sonnerat in Madagascar, as well as in the isles of Bourbon and Mauritius. Commerçon found it in the latter. The wood of this tree is light, white and pithy, as in *Ficus*, to which the genus is most nearly allied. *Leaves* on the young smooth branches, nearly opposite, stalked, elliptical, obtuse, entire, evergreen, very smooth, with a strong mid-rib, sending off numerous transverse veins; their size on young trees is a span in length, and above two inches in breadth; on old ones about one-third as much. *Flowers* in smooth clusters, from the older branches, or the trunk; their partial stalks about an inch long. *Receptacles*, before they expand, ovate, about the size of a filbert, somewhat roughish or scaly at the outside; when open the male ones, as they seem to us, spread about an inch and a half, displaying abundance of thick-set stamens, among which we can discern nothing else. The ripe fruit is two or three inches wide, of a depressed, roundish, unequal form, hollow, its

pulpy substance, in which the seeds are vertically imbedded, as in *Dorstenia*, being about one-third of an inch thick. The pulpy coat, which envelopes the seeds, is said to be orange-coloured, and to be used for a dye, like the American Arnotto, *Bixa Orellana*. Ambora is the Madagascar name of this tree. The affinity of the genus to *Ficus* and *DORSTENIA*, (see those articles,) cannot be overlooked. The foliage however is smooth; but that is the case with some others of this natural order, though indeed with but very few. Jussieu says the tree discharges a milky fluid, which confirms its relationship to *Ficus*; and if monkeys eat the fruit, as one of its names implies, it would certainly not prove poisonous to mankind, though, like many species of *Ficus*, it may be either tasteless or of a disagreeable flavour.

MITHRIDATES, in *Biography*, king of Pontus, surnamed "Eupator," and "The Great," was the son of Mithridates VI., the first king of that country who entered into an alliance with the Romans. At the death of his father, 123 B. C., he succeeded to the crown when he was only about 12 years of age. He was from a very early period of life accustomed to martial exercises, and the sports of the chase, by which he was enured to fatigues. In his mind were imprinted the characters of turbulence, ferocity, and suspicion, by which, particularly the latter, his life was preserved from several attempts made on him by those appointed to be his guardians. His mother had been appointed joint heir of the crown, but he very soon deprived her of power, and kept her in close confinement, in which she ended her days. When arrived at the age of manhood he took his own sister, Laodice, for a wife, which was the common practice of the eastern monarchs of that period. After the birth of a son he made progress through all the neighbouring Asiatic states, with the view of observing their strength and policy. In this journey he spent three years, during which his queen attached herself to one of the lords of the court, and on his return she made an attempt to poison him. He drank the potion, but his constitution was proof against its baneful contents, and the discovery of her infidelity and wicked intentions was the occasion of her death, with that of all her accomplices.

Mithridates now entered upon his career of ambition: he overran the neighbouring kingdom of Paphlagonia, which he at length divided with his ally Nicomedes, the king of Bithynia, totally regardless of the remonstrances of the Romans, who had declared it a free state. He next reduced Galatia, though under the protection of Rome: after this he anxiously wished to make himself master of Cappadocia, then possessed by his brother-in-law, and friend Ariarathes, whom he caused to be privately assassinated, upon which the kingdom was seized by Nicomedes, who married the widow. Mithridates, however, under the pretence of securing the crown for his nephew, drove out Nicomedes, and seated the young prince upon the throne, whom he afterwards stabbed by the most scandalous treachery. The Cappadocian army, who were witnesses of the abominable deed, threw down their weapons, and suffered Mithridates to take possession of all the fortresses in the kingdom. He now placed on the throne a minor son of his own, under the guardianship of Gordius, who had been his wicked instrument in assassinating his brother-in-law. The jealousy of Nicomedes induced him to bring forward a pretended son of Ariarathes, who was sent to Rome to lay his complaints before the senate, and implore its assistance to seat him on the throne of his fathers. Mithridates, apprized of the fact, sent deputies to state to the senate the impollure, and in the conclusion both kings were commanded to relinquish their claims, and the crown of Cappadocia was conferred

ferred upon Ariobarzanes. This was but the commencement of the dispute, and the Roman commanders, according to their usual practice, endeavoured to excite hostilities among the Asiatic kings, that they might have a pretence to interfere in their contests. From the year 90 B. C. open war may be considered as prevailing between the Roman republic and Mithridates, which was extinguished only by the death of the latter. The early successes of Mithridates led him to aspire to the honour of being the instrument of freeing all Asia from the Roman yoke, and at first he seemed to overrun, in an uninterrupted career, all the countries in their alliance and possession, being every where received by the people as their deliverer. His great object now was to ingratiate himself with people of all classes and countries by several popular acts, such as restoring, without ransom, all the Asiatic prisoners, who had fallen into his hands. The free cities of Asia, won over by these specious acts of generosity, opened their gates to him, and took pleasure in demolishing all the monuments erected by the Romans. Mithridates, determined upon irreconcilable enmity to that people, and wishing to involve the Asiatics in the same principles, sent to the magistrates throughout the cities in which any Roman citizens had established themselves, directing, that on a certain day a general massacre should be perpetrated on all of Italian birth or origin, not excepting women and the youngest children. In this horrid massacre it was imagined, that at least 80,000 Roman citizens lost their lives; some accounts have indeed reckoned them at nearly double that number.

By this master stroke of bloody policy, for which his name must for ever be transmitted with infamy, Mithridates made himself master of the whole of Lesser Asia, and proceeded, without remorse or delay, to the conquest of the neighbouring islands, several of which he quickly reduced. At Cos he took possession of a large sum of money, which had been deposited there by the Asiatic Jews, and intended for the temple of Jerusalem. He next made an attempt upon Rhodes but was defeated, and incurred so much personal risque, that he ever afterwards felt an abhorrence of the sea. Archelaus, one of his generals, crossing over to Greece, made himself master of Athens, while his own son Ariarathes conquered Macedonia and Thrace. He was now at the summit of power, and is said to have received the homage of twenty-five different nations. His memory and talent for the acquisition of languages were so great that he could converse with the natives of all of them without the aid of an interpreter.

From this period we may date his decline; Sylla procured of his countrymen the chief command against Mithridates, and sailing to Greece recovered Athens, in the year 86 B. C. He afterwards defeated with great slaughter the troops of Archelaus at Chæronea, and by two other decisive victories he put an end to the war in Greece. Mithridates was pursued from place to place, till at length he was obliged to submit to conditions, at which the greatness of his mind revolted: these conditions were, that he should resign all his conquests, and confine himself within his paternal dominions of Pontus; that he should release all his captives without ransom; pay down a large sum of money; deliver up the greatest part of his fleet; and practise no hostilities against those who had revolted from him and taken part with the Romans. Although the king had acquiesced in these terms, yet it was with the secret determination to break them as soon as he should be sufficiently powerful for the purpose. A new war kindled about the year B. C. 74, in which the success of Mithridates was so great that he recovered the best part of Pontus, which had, in the early part of the

course, been wrested from him, Bithynia, Cappadocia, and Armenia Minor. At length Pompey, invested with great powers, was sent by the Romans to put an end to this long continued war, which he accomplished by destroying, or dispersing all the king's troops, except a body of cavalry with which he forced a passage. Mithridates fled into Armenia, whence he withdrew to Colchis, and thence to Brythia, between the Euxine and Caspian seas. Here he was so completely concealed that it was supposed he was dead, till he emerged from his retreat at the head of a considerable army, and made himself master of several important places. His success was but short-lived, and those even who were willing to submit to his power, had no confidence in his cause, but chose rather to join what they thought was the strongest party. He now adopted the design of marching into Europe, and exciting the Gauls in his cause, which created such discontents in the army, as to lead them to choose Pharnaces, the favourite son of Mithridates, as their king. Having in vain attempted to reveal his son to the principles of duty, he attempted to destroy himself first by poison, and then by the sword, but in both he failed, and was at last dispatched, at his own request, by a Gallic mercenary. This was in the year B. C. 64, when the king had attained to the 71st year of his age. He was one of the most formidable enemies of the Roman republic, and the news of his death was received with the greatest joy and exultation. His body was delivered to Pompey, who, with the magnanimity of a generous enemy, bestowed upon it a most magnificent funeral. Mithridates was learned, and a patron of learning; he was particularly attached to medicine, and an electuary still bears his name. Plutarch. Univer. Hist.

MITHRIDATES, in *Natural History*, the name of a stone found in some parts of Persia, seeming to be the same as the mithridax or mithrax.

MITHRIDAX, the name of a gem described by Solinus, to which he ascribes qualities the same with those given by Pliny to the mithrax; and therefore probably the same stone with it.

MITIUSCHOV, in *Geography*, an island in the Frozen ocean, near the western coast of Nova Zembla, at the entrance of the Metochik Schau. N. lat. 75° 20'. E. long. 55 38'.

MITOC, a lake of Thibet, about 36 miles in circumference. N. lat. 31° 50'. E. long. 93 24'.

MITOMBA, a kingdom of Africa, in the country of Sierra Leona, situated on the banks of the river Sierra Leona, called also Mitomba.

MITRA, in *Botany*. See HELVELLA, MITREOLA, and OPHIORRHIZA.

MITRALIS VALVULA, in *Anatomy*, the valve placed at the opening, by which the left auricle and ventricle communicate. See HEART.

MITRARIA, in *Botany*, so denominated from a slight resemblance to a mitre, in the form of the outer calyx.—Cavan. Ic. v. 6. 57.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personata*, Linn. *Scrophularie*, Juss.

Gen. Ch. Cal. Perianth double, inferior, permanent, each of one leaf: the outer divided on one side nearly to the bottom, on the other but half way down; the segments ovate, concave, of equal lengths: inner about the same length, in five, deep, lanceolate, nearly equal segments. Cor. of one petal, ringent; tubes many times longer than the calyx, round, inflated upward, contracted at the mouth, pervious; limb short, spreading, in two lips; the upper in two parallel lobes; lower in three very deep ones; all ovate and obtuse. Stam. Filaments four, awl-shaped, two rather the longest, all longer than the corolla, inserted into the

bottom of its tube, with the rudiment of a fifth; anthers ovate, two-lobed. *Pist.* Germen superior, ovate; style awl-shaped, rather longer than the stamens; stigma slightly swelling, obtuse. *Peric.* Berry succulent, of one cell. *Seeds* numerous, oblong, polished, imbedded in pulp.

Obs. It is to be presumed that the germen has two cells, though they are obliterated in the ripe fruit. The double calyx distinguishes this genus from *Besleria*.

Ess. Ch. Calyx double; the outer in two lobes; the inner in five. Corolla two-lipped; the lower lip in three equal entire segments: tube inflated. Berry superior, of one cell, with many seeds.

1. *M. coccinea*. Cavan. Ic. t. 579.—The only known species. Gathered by Lewis Née at St. Carlos, in Chili, flowering in February. *Stem* shrubby, climbing; with weak opposite, squarish, slightly downy, jointed, leafy branches. *Leaves* opposite, sometimes three together, (as often happens to the shrubs of that country, witness *Fuchsia*, *Verbena*, and others), on short stalks, ovate, acute, strongly ferrated, about an inch long; green and slightly hairy above; glaucous beneath. *Flowers* on simple axillary stalks about the length of the leaves, usually solitary, sometimes two or three together, drooping, swelling and roughish towards the top. *Calyx* green; the outer one hairy. *Corolla* an inch and half long, of a rich scarlet. *Stamens* and *style* scarlet, with yellow anthers. *Berry* globose, the size of a currant, tipped with the permanent style.

MITRASACME, from *μῆτρα*, a bishop's mitre, and *ακμή*, the summit; Labillardiere says "*ακμή*, the flower," probably by an accidental mistake, or misconception. He invented this name for the plants in question, because the acute summit of the germen separates, as it advances to maturity, into two points, each crowned with half the divided style, and resembles the cloven termination of a mitre. Mr. Brown, though he adopts the name without alteration, observes, that *Mitragyne* would have been better. Labillard. Nov. Holl. v. 1. 36. Brown Prodr. Nov. Holl. v. 1. 452.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Gentianæ*, Juss. Brown. Labillardiere refers it to the *Scrophulariæ* of Jussieu, but certainly erroneously.

Gen. Ch. Cal. Perianth inferior, angular, in four, rarely but two, deep, acute, slightly spreading, permanent segments. *Cor.* of one petal, deciduous; tube angular, short; limb slightly spreading, in four deep, equal segments. *Stam.* Filaments four, awl-shaped, inserted into the tube, equal, usually shorter than the corolla; anthers heart-shaped, incumbent. *Pist.* Germen superior, ovate, acute, shorter than the calyx, cloven at the point; style terminal, thread-shaped, the length of the corolla, soon splitting lengthwise at the base, and finally all the way up; stigma capitate, two-lobed, finally divided. *Peric.* Capsule ovate, pointed, of two valves and two cells, the partitions from the inflexed margins of the valves, its apex splitting into two parts, each crowned with half the style, but still closed by the respective partitions. *Seeds* numerous, small, roundish, affixed to the central receptacles.

Ess. Ch. Calyx angular, four-cleft. Corolla deciduous, four-cleft, regular; its tube angular. Capsule superior, with two cells and many seeds, divided at the top. Style divided at the base. Stigma capitate.

This genus is most akin to *EXACUM*, (see that article,) but sufficiently distinct. Labillardiere describes but one species, Brown nineteen, of which the first sixteen answer most perfectly to the generic characters. We shall describe Mr. Brown's first and fourth species, as well as *M. Labillardiere's*.

M. polymorpha. Br. n. 1.—Umbel partly compound.

Flower-stalk elongated, smooth like the calyx, whose segments are naked at the summit. Leaves linear, somewhat fringed. Stem erect, hairy.—Gathered by Dr. White, as well as Mr. Brown, near Port Jackson, New South Wales. The root seems to be annual. *Stems* several, erect, from three to six inches high, simple, or slightly branched, leafy, round, hairy. *Leaves* opposite, in pairs crossing each other, sessile, three quarters of an inch long, pale, linear, keeled, revolute, entire, obtuse with a small point; more or less fringed towards the base; smooth above; sometimes hairy beneath. *Flower-stalks* terminal, longer than the stem, round, very smooth, simple or divided, terminating in an umbel of two, three, or four flowers, on long slender smooth stalks, one of which stalks often bears a lateral flower also, so that the umbel is then rather a *cyme*. A pair of short leaves accompanies the base of the umbel. The calyx is entirely smooth, pale, with green angles. *Corolla* white or purplish, bearded within, twice as long as the calyx. The flowers and inflorescence are not unlike *Androsace laetea*, Curt. Mag. t. 868, 981, in their general aspect.

M. canescens. Br. n. 4.—Umbel about three-flowered, sessile; its stalks smooth. Segments of the calyx bearded at the tips. Leaves linear, obtuse, hairy on both sides. Stem procumbent, hairy all over; with ascending branches.—Native likewise of Port Jackson. *Root* perennial. *Herb* much like the last but very hairy, and of a darker hue. The umbels, which have at most but three flowers, are accompanied at the base by a pair of short ovate hairy leaves, and stand each at the top of an elongated hairy branch. *Calyx* smooth, except a little bristly tuft at the point of each segment. *Corolla* pale blue or purplish, with somewhat broader rounder segments than the foregoing.

M. pilosa. Labill. Nov. Holl. v. 1. 36 t. 49. Br. n. 15.—Creeping, hairy. Leaves stalked, ovate, fringed. Flower-stalks axillary, solitary, about the length of the leaves. Calyx hispid.—Native of moist places in Van Diemen's land. *Labillardiere*. *Root* perennial, branched. *Herb* hairy, procumbent, branched. *Stem* round, hollow. *Leaves* opposite, rather fleshy, ovate, entire, about half an inch long, tapering at the base into a short footstalk. *Flower-stalks* sometimes shorter, sometimes longer than the leaves, round, simple, single-flowered. *Calyx* hairy all over. *Corolla* finely downy within; its limb short, in four shallow lobes.

All the species are herbaceous, some smooth, some hairy. *Leaves* sometimes all crowded about the root; always simple, undivided and entire.

None of these plants have been raised in Europe.

MITRAVINDA, in *Hindoo Mythology*, one of the eight wives assigned to Krishna.

MITRE, MITRA, from *μῆτρα*, which signifies the same; a pontifical ornament, worn on the head by bishops, and certain abbots, on solemn occasions.

The mitre is a round cap pointed, and cleft at top, with pendants hanging down on the shoulders, and fringed at both ends. The bishop's is only surrounded with a fillet of gold, set with precious stones; the archbishop's issues out of a ducal coronet. These are never used otherwise than on their coats of arms. Abbots wear the mitre turned in profile, and bear the crozier inwards, to shew that they have no spiritual jurisdiction without their own cloisters.

The pope has also granted to some canons of cathedrals the privilege of wearing the mitre. The counts of Lyons are also said to have assisted at church in mitres.

In Germany, several great families bear the mitre for their crest; to shew that they are advocates, or feudatories, of ancient abbeys, or officers of bishops, &c.

The pope has four mitres, which are more or less rich, according to the solemnity of the feast days they are to be worn on. The mitre was originally the women's head dress, as the hat was that of the men. This appears from Remulus in Virgil, who reproaches the Trojans, that they were dressed like women, and wore mitres.

“Et tunice manicas & habent redimicula mitræ.”

The cardinals anciently wore mitres, before the hat, which was first granted them by the council of Lyons, in 1243. Authors make no mention of the mitre as an episcopal ornament, before the year 1000.

MITRE, in *Architecture*, is the workmen's term for an angle that is just 45 degrees, or half a right one.

If the angle be a quarter of a right angle, they call it a half-mitre.

To describe such angles, they have an instrument called the mitre-square; with this they strike mitre-lines on their quarters, or battens; and for dispatch, they have a mitre-box, as they call it, which is made of two pieces of wood, each about an inch thick, one nailed upright on the edge of the other; the upper piece hath the mitre-lines struck upon it, on both sides, and a kerf, to direct the saw in cutting the mitre-joints readily, by only applying the piece into this box.

MITRE is used by the writers of the Irish history for a sort of base money, which was very common there about the year 1270, and for thirty years before, and as many after. There were, besides the mitre, several other pieces called according to the figures impressed upon them, rolaries, lionades, eagles, and by the like names. They were imported from France, and other countries, and were so much below the proper currency of the kingdom, that they were not worth so much as a half-penny each. They were at length decayed in the year 1300, and good coins struck in their place. These were the first Irish coins in which the sceptre was left out. They were struck in the reign of Edward, the son of our Henry III., and are still found among the other antiquities of that country. They have the king's head in a triangle full-faced. The penny, when well preserved, weighs twenty-two grains; the halfpenny ten grains and a half.

MITRE-SILS, in *Canals*, are the angular sils of lock-gates.

MITRED ABBOTS. See ABBOT.

MITREKE, in *Geography*, a town of Arabia, in the province of Oman; 44 miles W. of Haske.

MITREOLA, in *Botany*, a name given by Linnæus, in the first edition of his *Genera Plantarum*, to the *Mitra* of Houkoun, engraved in the nineteenth unpublished plate of that botanist, both names alluding to the resemblance of the minute capsule to a mitre. See OPHIORRHIZA.

MITROVATZ, in *Geography*, a town of Slavonia; 32 miles E.N.E. of Gradisca.

MITTA, in our *Old Writers*, is an ancient Saxon measure. Its quantity is not certainly known; but it is said to be *mensura decem modiorum*, a measure of ten bushels. Doomsday.

Mitta, or *mitcha*, being besides a measure for salt and corn, is used for the place where the cauldrons were put to boil salt. “Chalderias quoque ad sal conficiendum cum propriis sedibus mitche vocantur.”

MITTAMPOUR, in *Geography*, a town of Hindoostan, in Rohilcund; 20 miles S.W. of Bissowla.

MITTAW, the capital of the duchy of Courland, the residence of the duke and of the regency of the country, situated on the river Aa, in that part of the duchy called “Semigallia.” The town is extensive, containing within

its circuit many gardens and vacant spaces. The walls and moats are decayed, and the houses are destitute of elegance; nevertheless it is tolerably well inhabited. It has two Lutheran churches, a beautiful Calvinistic church, and a Popish church. The town school, though the principal in the country, is not flourishing. The palace, built by the late duke, is a pile of buildings, in which are spacious and handsome apartments almost wholly unfurnished. The academy, constituted at a great expence, contained, in May 1785, almost as many professors as students, the former being eight, and the latter twenty; 56 miles W. of Riga. N. lat. 56° 38'. E. long. 23° 10'.

MITTELWALD, or MIEDZIBOR, a town of Silesia, in the principality of Oels; 16 miles N.E. of Oel. N. lat. 51° 23'. E. long. 17° 40'.—Also, a town of Silesia, in the county of Glatz, on the Neisse, near its source, and on the borders of Bohemia; 27 miles S. of Glatz. N. lat. 50° 2'. E. long. 16° 29'.

MITTENDARI, among the Romans, commissioners sent into the provinces by order of the *prefectus pratorii*, or captain of the guards, upon some public account, as to inspect the behaviour and management of provincial governors, and observe whatever was amiss; all which they were to lay before the prefect, who had authority to remedy such abuses.

MITTENDIS *Recordo & Proecessu*. See RECORDO.

MITTENDO *Manuscriptum Pedis Finis*, in *Law*, a writ judicial, directed to the treasurer and chamberlains of the exchequer, to search for and transmit the foot of a fine, acknowledged before justices in eyre, into the common pleas, &c.

MITTENWALD, in *Geography*, a town of Bavaria, in the bishopric of Freysing; 10 miles N.N.W. of Innspruck.

MITTENWALDE, a town of Brandenburg, in the Middle Mark; 22 miles S.E. of Potsdam. N. lat. 52° 15'. E. long. 13° 32'.

MITTER L'ESTATE, and *Mitter le droit*. See RELEASE.

MITTERBURG, in *Geography*, a town of Istria, and capital of a county, containing several churches and a convent; defended by a castle, which is situated on a rock; 30 miles S.E. of Trieste. N. lat. 45° 23'. E. long. 14° 7'.

MITTERSILL, a town of Salzburg, on the Salz- bach; 36 miles S.S.W. of Salzburg.

MITTIMUS, in *Law*, a writ by which records are ordered to be transferred from one court to another; sometimes immediately, as out of the king's bench into the exchequer; and sometimes by a certiorari into the chancery; and from thence, by a mittimus, into another court.

MITTIMUS is also used for a precept in writing, directed by a justice of peace to a gaoler, for the receiving and safe-keeping a felon, or other offender, by him committed to the gaol.

This is a warrant under the hand and seal of the justice, containing the cause of the commitment of the offender.

MITTWEYDA, in *Geography*, a town of Saxony, in the circle of Leipzig; 30 miles W. of Dresden. N. lat. 50° 58'. E. long. 12° 52'.

MITU, or MITU-PORANGU, in *Ornithology*, the name of a Brazilian bird of the pheasant kind, according to Mar- grave, and the generality of those who speak of it; but supposed by Mr. Ray rather to approach to the nature of the peacock or turkey-cock; and in the Linnæan system a species of the *crax*; the *CRAX Alegor*, which see.

MITYLENE, or METELIN, the ancient *Lesbos*, one of

MITYLENE.

the most considerable islands of the Grecian Archipelago, is situated in the vicinity of the coast of Natolia, which it seems to command, and it is placed at an equal distance from the gulf of Smyrna and the channel of Constantinople, not far from the principal islands of the Archipelago. By this position the possession of it is extremely important, more especially as its interior resources render it susceptible of the most flourishing state. But being in the hands of the Turks, the advantages of its situation are lost, and its population, agriculture, and industry are from day to day diminishing and falling into decay. In some parts of the island, said to be 36 miles long and 14 broad, are volcanic mountains and others composed of marble, that extend almost through the island: its mountains are covered with wood, particularly with pines that yield excellent pitch for the use of the dock-yard established near the fourth harbour, and for the careening of the vessels and boats which come to Mitylene for that purpose. On these mountains are also found oaks, the arbutus, the andrachne, the lentisk, the turpentine tree, the myrtle, the agnus castus, a few leguminous shrubs, and several rock-roses, among which is that which yields the ladanum. The "velana" oak is more common on the rising grounds and in the plains than on the mountains. The elm grows in the low and watered places, and the plane tree is chiefly found on the brinks of the rivulets and torrents. The mountains also afford a variety of springs, of which some are medicinal. The vallies of the island are extremely fertile, well watered, and in some degree cultivated, though in this respect they admit of much improvement. The principal towns of this island are Mitylene and Molivo, which see; and its harbours are port Caloni and port Olivier. At the head of port Caloni is a plain two leagues in extent, the principal culture of which consists in corn, cotton, and olive trees; figs, musk and water melons, pumpkins, and various legumes are also gathered here. Here are several villages; but the population is not proportioned to the fertility and extent of the soil adapted to culture. The air in this quarter is insalubrious, and often fatal; so that these villages are inhabited only by poor Greek cultivators: the Turks, who are proprietors of lands, preferring a residence at Mitylene, Molivo, and the other places that are best situated in the island.

Port Caloni lies in the middle of the southern part of the island; it is very extensive and very safe, but little frequented; none but vessels thwarted by the wind, or buffeted by a storm, anchoring here, and not one entering it to take in a cargo, or to unload. The other port, called port Yero or port Olivier, derives its name from the great number of olive trees which are planted in the adjoining plain, and on the declivity of the mountains and hills that surround it. In the eastern part of the harbour, there are a few calcareous hills, which have not been attacked by the fire of volcanoes. Here is found near the sea a copious spring of hot mineral water, much valued by the inhabitants of Mitylene. The captain-pacha has built here a basin capable of containing 10 or 12 persons; he has also repaired the building, which is occupied by the Turk charged to receive all those who wish to make use of these waters; which are nearly two leagues from Mitylene. Port Olivier is one of the safest and most spacious harbours of the Archipelago; it lies at the eastern and southern extremity of the island, and is said to abound with fishes and conchylia, among which are excellent oysters, which are carried to Scio and Smyrna. It is frequented, during the whole year, by boats and vessels that come hither to load with the oil which is made in the environs. Although this island is exposed in winter to sudden gales of wind from the N.E. and the E., which come from the mountains of

Asia, as well as to the N. wind, which reigns over the whole Archipelago, the climate is nevertheless tolerably fine, and the temperature of the air somewhat mild. It seldom freezes in that season; but in summer the heat is rather powerful on the S. coast, and the air is, in general, more unwholesome there than in the other parts of the island. This island is divided into lordships; but as the aga of other countries is obliged to join the land-forces when required at Mitylene, he is subject to a maritime duty, from which he contrives to exempt himself by some pecuniary sacrifices. In Mitylene are reckoned 8000 Greeks paying the karatch, (capitation tax,) from the age of seven to their death; so that the population may be estimated at near 20,000, including the women and children above that age. It is thought that there are nearly as many Turks as Greeks in the island, which contains in all 40,000 inhabitants. The Jews are not sufficiently numerous to be taken into the calculation. According to an ancient custom in this island, the eldest daughter alone inherits the property of the father and mother to the exclusion of the sons and other daughters. This custom has been long respected and religiously followed; but of late the patriarch of Constantinople, the archbishop, and all the clergy of Mitylene have somewhat modified this law, by admitting all the daughters to a partition in a certain proportion. The quantity of oil which is exported from this island in ordinary seasons is estimated at upwards of 50,000 quintals; almost the whole of which is sent to Constantinople. The oil is, in general, but of an indifferent quality, because the inhabitants, not having a sufficient number of mills, are obliged to gather their olives slowly. Italy draws from Mitylene 8000 quintals of "Velanida," a part of which comes from the coast of Asia. Dried figs are an article of exportation of little importance, as well as wool. Cotton, sesamum, silk, ivory, wax, and different species of grain are gathered in a small quantity; but the last are not sufficient for the supply of the inhabitants, who draw a great quantity of wheat and barley from the coast of Asia. They also import oxen, horses, and mules for agriculture and draught, as well as part of the sheep that are killed at the slaughter-house. Wine is now scarce, because a great part of the grapes is employed by the Turks in making confection, and because the Turks are accustomed to convert the other into brandy. The wine of ancient Lesbos has lost its reputation, being sweet and ill-flavoured, as are, in general, all the wines of the Archipelago. Although there are no rivers in this island, a few torrents, supplied by rain waters and springs, serve to furnish sufficient water for consumption and for watering part of the plains, so as to procure for the inhabitants legumes, herbage, and fruits.

In the channel formed by the island of Mitylene and the coast, at the entrance of the Adramyttian gulf, are some small islands, which the Greeks call "Musconisi," and navigators "Myconisses," but formerly they bore the name of "Hecatones." They are said to be fertile in wines and oil. For the ancient state of this island, see LESBOS.

MITYLENE, sometimes called "Castro," or "Metelin," is the chief town of the island above described. It contains 2 or 3000 Greeks, 3 or 4000 Turks, and 30 or 40 Jewish families. The citadel is spacious, provided with cannon in tolerably good condition, and defended by 5 or 600 janizaries, almost all married and settled. Within it are two mosques and a great number of houses occupied by this militia. The modern town extends in a semicircle along the north harbours, on a part of the ground occupied by the ancient city; of the former grandeur of which some remains are still visible. Cicero de Leg. Agr. and Vitruvius, lib. i. c. 6. expatiate on its magnificence. Such was the flourishing

flourishing state of the fine arts in the city of Mitylene, called by Strabo *ἡ μουσικὴ πόλις*, when Marcellus, after the battle of Pharsalia, returned to end his days there in literary ease, that a modern traveller, after the lapse of 17 centuries, could behold nothing but proofs of the splendour to which they had attained. *Tournef. Voy. du Lev. tom. ii. p. 81. See LESBOS.*

The two harbours of Mitylene are separated by a tongue of land, on which was constructed by the Genoese a citadel, which the Turks have preserved. The upper or north harbour is secured from the N.E. wind by a jetty, the origin of which is carried back to ancient Greece. The south harbour is open and faces the S.E.; it is a little less extensive and less deep than the other; none but the boats of the country can anchor in it, while the north harbour can admit small merchant vessels. Men of war and European ships, which commerce attracts to Mitylene, anchor in summer off the south harbour; but they scarcely expose themselves there in winter, because there happen sometimes in that season very impetuous gales from the N.E., which might occasion their destruction, or oblige them to cut their cables, and get under sail with all expedition. There was formerly a canal of communication between these two harbours, which separated the tongue of land just mentioned, and formed of it an island, on which was built part of the town. Time has choked up the canal, but it has not destroyed the jetty, which ran from the little island, and sheltered the north harbour from the worst weather. N. lat. 39 20'. E. long. 26 14'. *Olivier's and Sonnini's Travels. Clarke's Travels, vol. ii.*

MITZLER, LORENZ CHRISTOPH, of Kolof, in *Biography*, born in 1711, a singular character and voluminous publisher on musical subjects. But before he meddled with music, his pretensions were various. He set off a doctor of physic, then got ordained a minister of the Lutheran church, and next assumed the character of a counsellor learned in the law. After trying his hand at these professions, in music he appeared at first a theorist and critic more than a practical musician. In 1740, however, he composed odes, which were mathematical, dry, and dull. These were ridiculed throughout Germany. Mattheson is very jocular on his works; but Mitzler took all for serious panegyric. Among his numerous productions specified by Gerber, (in his continuation of Walther's Musical Lexicon,) many of which have, perhaps, never been read, there is no one which seems to have merited that honour. He died in 1778. If his life was of little use to the world, it must be owned that he diligently tried to render the world useful to himself.

MITZUZ, in *Geography*, a town of Japan, in the island of Nippon; 110 miles W.N.W. of Jedo.

MIXCO, a town of Mexico, in the province of Guatimala; 25 miles E. of Guatimala.

MIXEN, in *Agriculture*, a term applied to a compost dunghill. See COMPOST and MANURE.

MIXING of Mortar. See MORTAR.

MIXIS, *Μίξις*, *Mixture*, in the *Ancient Music*, was one of the parts of Greek melopœia, by which the composer was instructed how to combine intervals properly, and distribute them in different genera and modes, according to the character of the melody proposed. See MELOPŒIA.

MIXO-LYDIAN, the name of one of the modes of ancient music, called also *Hyper-Dorian*; which see. The mixo-lydian mode was the most acute of the seven modes to which Ptolemy had reduced all the modes of the Greek music. (See MODE.) This mode was said to be affecting and passionate, exciting great emotions, and therefore applicable to tragedy. *Aristoxenus* assures us, that it was invented by

Sappho; but *Pittarch* avers, that ancient fables ascribe it to Pytochides. He also says that the Argians fined musicians who first adopted it, and who had introduced into music the use of seven strings; that is, making the seventh string a key-note.

MIXT, or MIXED Body, in *Philosophy*, is that which is compounded of divers elements or principles.

By which *mixt* stands contradistinguished from *simple*, or *elementary*, which is applied to bodies consisting of one principle only.

The schoolmen define a mixt body to be a whole resulting from several ingredients, altered, or new modified, by the mixture. On which principle the several ingredients do not actually exist in the mixt; but they are all changed, so as to conspire to a new body, of a different form from that of any of the ingredients. But the modern philosophers rarely conceive the term in so much strictness. The business of chemistry, we say, is to resolve mixt bodies into their principles, or component parts.

The school philosophers distinguish mixt bodies into perfect and imperfect.

MIXTS, *Perfect*, are the class of organized and animated bodies, where the elements, or ingredients of which they are composed, are changed, or transformed, by a perfect mixture. Such are plants, beasts, and men.

MIXTS, *Imperfect*, are unorganized and inanimate bodies, the forms of which remain still the same as of the ingredients that constitute them. Such are meteors, minerals, metals, &c.

MIXT, in *Chemistry*. See AGGREGATE.

MIXT, or *Mixed Action*, in *Law*. See ACTION.

MIXT Angle, *Fable*. See ANGLE, and FABLE.

MIXT Figure, in *Geometry*, is that which consists partly of right lines, and partly of curve lines.

MIXT Force, *History, Mathematics*. See FORCE, HISTORY, and MATHEMATICS.

MIXT, or *Mixed Larceny*. See LARCENY.

MIXT Mode. See MODE.

MIXT Number, in *Arithmetic*, that which is partly an integer, and partly a fraction: as $4\frac{1}{2}$.

MIXT Obligation. See OBLIGATION.

MIXT Ratio, or *Proportion*, is when the sum of the antecedent and consequent is compared with the difference between the antecedent and consequent: as if $3 : 4 :: 12 : 16$
 $a : b :: c : d$

then $7 : 1 :: 28 : 4$
 $a + b : a - b :: c + d : c - d.$

MIXT Salts, *Stairs, Service*. See SALTS, STAIRS, and SERVICE.

MIXT Tithes, are those of cheese, milk, &c. and of the young of beasts. See TITHE.

MIXTILINEAR ANGLE. See ANGLE.

MIXTION, MIXTIO, or *Mislio*, the act of mixing; or the union and coalition of divers conspicles into one body. The Peripatetics, who hold an alteration essential to mixtion, define it the union of several altered ingredients, or miscibles.

Mixtion makes a considerable operation in the chemical and Galenical pharmacy; where divers powders, species, and other simples, are said to be *mixed*, *misceri*, though without any communication, or transition of the virtues of one into those of another. See COMBINATION and COMPOSITION.

MIXTURE, MESCOLANZA, a connection in the modes of canto-fermo, in chants which go higher or lower than the octave, and modulate into another mode, participating both

both of authentic and plagal. The mixture is only practicable in modes that go in pairs, as the first mode or tone, and the second, the third with the fourth, the plagal with the authentic, and reciprocally.

MIXTURE, the name of a stop in the full organ, repeating the same intervals of the octave in the key of C throughout the scale. See FURNITURE.

MIXTURE, *Mixtura*, or *Mislura*, in a philosophical sense, is an assemblage, or union, of several bodies of different properties, in the same mass.

To determine the ratio of the ingredients of a mixture, is that celebrated problem proposed by Hiero, king of Syracuse, to Archimedes, on occasion of a crown of gold, in which the workman had fraudulently mixed silver; the solution of which was matter of so much transport to that divine mechanic. See *HIERO'S CROWN*.

MIXTURE, in *Matters of Drapery*, denotes the union or blending of several wools of different colours, not yet spun. Hence a mixture, or mixed stuff, is that whole wool and warp are of wools of different colours, dyed and mixed before they were spun. See CLOTH.

MIXTURE, in *Pharmacy*, differs from a julep in this respect, that it receives into its composition not only salts, extracts, and other substances dissoluble in water, but also earths, powders, and such substances as cannot be dissolved.

Mixtures depend upon diffusion and suspension in any liquid of insoluble substances minutely divided; and for this purpose, it is often necessary that the liquid itself should be rendered more dense by the addition of some viscid matter, as mucilage or syrup. Mixtures are sometimes denominated from their medical properties and effects; such as astringent, diuretic, laxative, &c. but most commonly from the name of the principal ingredient used in their composition. The London college includes under the general head of mixtures those medicines which have usually been denominated *emulsions*. See EMULSION.

The principal mixtures are the following:

Mislura ammoniaci, Mixture of gum ammoniac, P. L. is formed by rubbing two drachms of gum ammoniac with half a pint of water gradually poured upon it, until they are perfectly mixed. A similar preparation, under the name of *lac ammoniac*, milk of ammoniac, is ordered by the Dublin college to be made by triturating a drachm of gum ammoniac in eight fluid-ounces of penny-royal water, gradually adding the water until the mixture acquires the appearance of milk, and then straining it through linen. This preparation is beneficially employed as an expectorant in doses of from f. ℥ss to f. ℥j, combined with an equal quantity of almond mixture.

Mislura amygdalæ, Almond mixture, P. L. 1809, *Lac amygdalæ*, P. L. 1787, *Emulsio communis*, P. L. 1745, is prepared by gradually adding a pint of distilled water to two ounces of almond confection, and rubbing them together. A similar mixture, called *emulsio amygdalæ communis*, almond emulsion, in the Edin. disp. is prepared by well beating an ounce of blanched sweet almonds in a stone mortar, gradually adding 2½ lbs. of water, and then straining. The *lac amygdalæ*, almond milk of the Dub. coll. is formed by rubbing 1½ oz. of sweet almonds blanched with ½ oz. of purified sugar, adding gradually 2½ pints of water, and then straining. The *emulsio vinosæ niloticæ*, emulsio arabica, Edin. or emulsion of gum arabic, is made in the same manner as the almond emulsion, 2 oz. of gum arabic being added during the trituration of the almonds. The *Arabic emulsion*, Dub. is prepared by dissolving two drachms of gum arabic in powder in a pint of warm decoction of barley, and when it is almost

cold, pouring it gradually upon half an ounce of blanched sweet almonds beaten to a palle, with the same quantity of purified sugar, triturating at the same time so as to form a milky mixture; and then straining.

The mixtures above described are used as diluents and demulcents in inflammatory fevers, strangury, dysury, and other affections of the urinary organs; but they are principally employed as vehicles for the exhibition of more active remedies. The dose is from f. ℥ij to oʒs frequently repeated.

Mislura affasætidæ, Mixture of affasætida, P. L. 1809, *Lac affasætidæ*, P. L. 1787, is prepared by rubbing two drachms of affasætida with half a pint of water, gradually poured upon it, until they are perfectly mixed. The *lac affasætidæ*, milk of affasætida, Dub. is obtained by triturating a drachm of affasætida with eight fluid-ounces of penny-royal water gradually added until an emulsion is formed. This mixture is chiefly used as an enema in flatulent colic, worms, and convulsions of infants occasioned by irritation of the bowels during dentition. When given by the mouth, the dose may be from f. ℥ss to f. ℥jss often repeated.

Mislura camphoræ, Camphor mixture, P. L. 1809, *Mislura camphorata*, P. L. 1787, *Julepum è camphora*, P. L. 1745, is formed by rubbing half a drachm of camphor with 10 minims of rectified spirit, then adding gradually a pint of water, and straining the liquor. The *mislura camphorata*, Dub., camphorated mixture, is prepared by rubbing a scruple of camphor with 10 drops of rectified spirit of wine, and then with half an ounce of refined sugar, adding a pint of water during the trituration, and straining the mixture through linen. This is an elegant vehicle for more active remedies in low fevers and nervous affections. The dose is from f. ℥j to f. ℥ij, given every three or four hours. The *emulsio camphorata*, Edin., camphorated emulsion, is made of a scruple of camphor, two drachms of sweet almonds blanched, a drachm of refined sugar, and 6 oz. of water, in the same manner as the common almond emulsion. This is given with advantage in typhus and nervous cases in doses of f. ℥ij, every three or four hours. See CAMPHOR.

Mislura cornu ussi, Mixture of burnt hartshorn, P. L. 1809, *Decoctum cornu cervi*, P. L. 1787, *Decoctum album*, P. L. 1745, is prepared in the manner described under *Hart's HORN*.

Mislura cretæ, Chalk mixture, P. L. 1809, *Mislura cretacea*, P. L. 1787, *Julepum è cretæ*, P. L. 1745, is formed by mixing half an ounce of prepared chalk, three drachms of refined sugar, half an ounce (an ounce Dub.) of acacia gum powdered in a pint of water. The *potio carbonatis calcis*, olm, *potio cretacea*, Edin., chalk potion, is made by rubbing together 1 oz. of prepared carbonate of lime (chalk), ½ oz. of refined sugar, 2 oz. of mucilage of gum arabic, then gradually adding 2½ lbs. of water and 2 oz. of spirit of cinnamon, and mixing them.

These preparations of chalk are given in acidity of the primæ viæ, and combined with opium or catechu in diarrhœa. The dose is from f. ℥j to f. ℥ij, given every three or four hours; or after every liquid evacuation.

Mislura ferri composita, Compound mixture of iron, P. L. 1809, is prepared by rubbing together a drachm of powdered myrrh, 25 grains of subcarbonate of potash, and a drachm of refined sugar, and during the trituration adding gradually, first, 7½ oz. of rose-water and half a fluid-ounce of spirit of nutmeg, and lastly, a scruple of sulphate of iron powdered. The mixture should be immediately poured into a proper glass bottle and stopped close. The myrrh requires to be well dried before it can be reduced to powder. This mixture, which is very similar to the celebrated anti-hectic

hectic mixture of Dr. Griffiths, is a compound very commonly directed as an useful tonic, particularly in hysteria and chlorosis, and in phthisis, when no active inflammatory diathesis subsists. The dose is from f. ℥j to f. ℥ij, given two or three times a day.

Mistura guaiaci. Mixture of guaiacum, P. L. 1809, *Lac guaiaci*, P. L. 1787, is made by rubbing 1½ drachm of guaiacum gum-resin with two drachms of refined sugar; then with two fluid-drachms of mucilage of acacia gum, and when they are mixed, pouring on gradually eight fluid-ounces of cinnamon water. This is administered in doses of from f. ℥ss to f. ℥ij, two or three times a day; diluting freely with tepid barley water or gruel for aiding its operation.

Mistura moschi. Musk mixture, P. L. 1809, *Mistura moschata*, P. L. 1787, *Julepum é moscha*, P. L. 1745, is prepared by rubbing a drachm of musk with the same quantity of refined sugar, then with the same quantity of acacia gum powdered, and adding by degrees six fluid-ounces of rose-water. This may be given to the quantity of f. ℥ij every three or four hours in spasmodic affections and the sinking state of typhus. The late Mr. White of Manchester found this mixture combined with ammonia ℥f, spirit of lavender f. ℥i, and spirit of juniper f. ℥j, very useful in sloughing phagedenic ulcers of a syphilitic and strumous nature.

MIZÆEL, in *Geography*, a town of Norway, in the diocese of Drontliem; 44 miles N.E. of Romsdal.

MIZELL, a town of Bohemia, in the circle of Bolef-law; nine miles S.E. of Jung Buntzel.

MIZEN. See MISEX.

MIZEN-HEAD, in *Geography*, supposed to be the Notium of Ptolemy, a cape of the county of Cork, Ireland, being the south-westerly extremity of the island as well as of the county of Cork. N. lat. 51° 23'. W. long. 9° 43'.

MIZEN-HEAD, a cape of Ireland, in the county of Wicklow, on the E. coast between Wicklow-head and Arklow. N. lat. 52° 52'. W. long. 6° 4'.

MIZNEPETH, in the *Jewish Antiquities*, a kind of mitre worn by the high-priest. See CIDARIS.

MIZQUITL, in *Botany*, a name used by some authors for that species of the acacia, or Egyptian thorn, whose unripe fruit affords the inspissated juice, which is the true succus acacie of the shops, and whose gum naturally flowing from the trunk and branches is the true gum arabic.

MIZZY, in *Agriculture*, a term sometimes applied to a bog, or a quagmire.

MLIOWNOWY, in *Geography*, a town of Poland, in the palatinate of Kiev; 40 miles S.W. of Czyrkafy.

MLLAVA, a town of the duchy of Warsaw; 40 miles N.N.E. of Plozk.

MLODE, a town of Poland, in the palatinate of Kiev; eight miles S.E. of Bialacerkiew.

MNAKEH, a town of Arabia, in the province of Yemen; 12 miles W. of Sana.

MNASIUM, in *Botany*, is most probably named by Schreber from some resemblance to the *μνασιον* of Theophrastus, an Egyptian plant, eatable like *papyrus*, and of a very sweet taste. Mart. Schreb. 214. Willd. Sp. Pl. v. 2. 22. Mart. Mill. Dict. v. 3. (*Rapatea*; Aubl. Guian. v. 1. 305. Juss. 44. Lamarek Illustr. t. 226.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Eufata*, Linn. *Junci*, Juss.

Gen. Ch. *Cal.* Spatha of two, ovate valves, terminated by a linear, spreading leaf. Perianth inferior, of one leaf, divided into three, lanceolate, concave, acute, bordered segments. *Cor.* of one petal; tube very short; limb cloven into three, deep, lanceolate, concave, acute seg-

ments. *Stam.* Filaments six, very short, inserted into the tube; anthers long, square, terminated by an ovate, excavated, acute leaflet. *Pyl.* Germen superior, three-lobed, roundish, marked with three streaks; style very long, striated; stigmas three, spirally twisted together. *Peric.* and *Seed* unknown.

Eff. Ch. Spatha of two valves, many-flowered. Calyx three-cleft. Corolla of one petal, three-cleft, with a very short tube. Anthers terminated by a leaflet. Stigmas three, spirally twisted.

1. *M. paludosum* Willd. and Martyn. (*Rapatea paludosa*; Aubl. Guian. t. 118)—Native of woods, marshes, and the banks of rivers in Guiana, flowering in June.—Root perennial, woody, fibrous. Stalks numerous, naked, two feet high, striated, compressed, bordered, gradually broader towards the top, and springing from the bases of the radical leaves. Leaves very long, narrow, acute, smooth, striated, entire; sheathing at the base, and mutually embracing each other; narrower above the sheath. Flower-stalks scaly beneath the base of the calyx. Corolla yellow.

Willdenow observes, that *Mnasia* has greatly the habit of a *Pontederia*, but that it differs materially from that genus in the structure of its flowers.

MNEME-CEPHALICUM BALSAMUM, the name of a famous compound balsam, said to have been purchased from a certain English physician by Charles duke of Burgundy, at the price of 10,000 florins. Some who have been very lavish in its praises have affirmed, that it has a power of preserving in the mind the remembrance of all things that are past; but this kind of praise seems to be extravagant and unfounded; inasmuch, that we think it needless to enumerate the ingredients of which this famous balsam (which we regard as fabulous in the effects ascribed to it) consists. We shall therefore content ourselves with referring to Sennertus' account of it in his Pract. lib. i. cap. 5.

MNEMONIC TABLES. Among the artifices to assist the memory, this is one of great use.

Mnemonic tables exhibit in a regular manner, what is to be remembered of the same subject. And although the sciences ought to be taught in a scientific manner, as much as possible, and that every thing should be so placed as to be intelligible and demonstrable from what has preceded it; yet tables ought not to be rejected, as they are helps to retain the doctrines of which the mind has had sufficient evidence. In such tables the properties of things are to be expressed concisely; illustrations and demonstrations should be left out, as the proposition ought to have been made sufficiently clear and certain, before it is registered in the table. Hence, the contents of such tables ought only to be the definitions, and the propositions relative to the subject. If a subject require a long table, this may be subdivided into smaller; by making first a table of the most general heads, and referring from each of these heads to a separate table; by this means the order and connection of the whole will be preserved. Such tables would produce a local and artificial memory, of great use to the retention and recollection of things. They would greatly facilitate a distinct view of the properties of their subjects, and facilitate recapitulation. Besides, as the expressions used in such tables ought to be very concise, so as just to be sufficient to excite the idea of the object to be remembered, soon after that idea has been acquired; after some time a certain obscurity will be found in perusing the tables, which will give us timely warning that our ideas begin to fade, and that they ought to be renewed. And this may be done without much trouble, if not too long delayed.

MNEMO-

MNEMONICA, formed of *μνημονεύειν*, I retain in memory, denotes the art of memory. Under the article MEMORY we have illustrated the nature and operation of this faculty, and mentioned some of the principal methods, both ancient and modern, which have been invented for aiding the exercise of it. Since that article was printed, we have had an opportunity of perusing a publication, entitled "The Art of Memory, founded upon the principles taught by M. Gregor Von Feinaigle," &c. The author has, with great industry of research, detailed the principal systems of artificial memory, both before and after that of Mr. Grey was announced to the public in his "Memoria Technica," of which we have given a concise account under the article above cited. It sufficiently appears, without any laboured proof, that the principal expedient for assisting the memory is derived from association; and of this expedient Simonides, Cicero, and Quintilian availed themselves in the contrivances which they suggested for this purpose. Having fixed upon certain symbols of the subjects which they wished to recollect, they would transfer these symbols to the different compartments of a house, or public building, or to the different parts of the walls of a city, a public road, or a picture, and when these compartments, &c. presented themselves to view, or occurred in recollection, they would suggest the symbols attached to them, and these symbols would revive the remembrance of the sentences or subjects, or parts of those sentences, to which they appertained: and thus, by means of such compartments and symbols, a whole discourse might be committed to memory, and recollected when occasion required. Upon these principles, as we have reason to believe, was founded the topical memory of the ancients; and from this source, without doubt, are derived all the various systems of local and symbolical memory, that have been practised in more modern times.

Bradwardine seems to have been the first, who in this country made an attempt to form a system of topical memory on the plan of the ancients. (See BRADWARDINE.) The "Ars Memorativa" of Publicius, probably printed before the year 1482, treats of the arrangement of places, and the combination of images, and has been the fountain whence many subsequent writers have derived considerable information. Grataroli, in his "Castel of Memorie," a translation of which by W. Fulwood was published at London in 1562, and Thomas Watson of Oxford, in his MS. entitled "Artificiose Memorix Libellus," dated 1583, preserved in the British Museum, have referred to the ancient plan of dividing houses and walls for the assistance of the memory. J. Baptista Porta, in his "Ars Reminiscendi," printed at Naples in 1602, treats, like the authors already mentioned, of places and images; exchanges figures for symbols; represents letters by symbols, and gives two alphabets, one consisting of letters formed from various objects, and another, in which they are deduced from the different positions of the human body. Schenckel, a native of Bois-le-Duc, in 1547, and the author of "Gazophylacium Artis Memorix," published in 1610, propagated his discoveries in the mnemonic art through the Netherlands, Germany, and France, and they were received with great applause. The performances of this author excited astonishment; he repeated 40 sentences of some length, without any connection, and after merely writing them down and reading them twice, backwards and forwards, and in any order that was desired. Some of his pupils also distinguished themselves in a still more surprising manner. A German translation of Schenckel's work was published by Dr. Klüber, in 1804, under the title of "Compendium der Mnemonik, &c." The treatise of John Willis, entitled "Mnemonica

&c." Lond. 1618, and a translation of which by Sowersby was published at London in 1661, contains many curious particulars. His plan is that of a topical memory; or of a memory to be assisted by some suitable edifice, and its appropriate divisions. The "Ars Memorix localis," published at Leipsic in 1620, and written by one of the professors of the university, merits preference, according to Morhof in his "Polyhistor," to all the treatises on mnemonics for perspicuity and arrangement. Morhof, in his dissertation "De Arte Lulliana" (see Polyhistor, T. t. l. 2. c. 5.) has preserved an elaborate account of Raymund Lully's system of artificial memory, to which he directed his attention at a very early period, and he is supposed to have been the first among the moderns who practised this art. (See the article LULLY.) D'Assigny's "Art of Memory," a third edition of which was published in London in 1706, contains many useful observations on the importance of a retentive memory, and on the mode of aiding the exercise of it; but it closes with some fanciful receipts for "comforting the memory," principally taken from early writers on this subject, and hardly deserving to be rescued from oblivion. Buffier's "Pratique de la Memoire Artificielle, &c." 8vo. Paris, 3 tom. 1719—1723, is intended to facilitate the acquisition of chronology and universal history, and his system is said to be ingenious and simple. Of Grey's "Memoria Technica" we have given a concise account under the article ARTIFICIAL MEMORY; more need not here be said, as this useful manual is in almost every one's possession. Lowe's "Mnemonics delineated in a small Compaſs and easy Method, &c." 8vo. Lond. 1737, is considered by Dr. Watts as a material improvement of Grey's treatise, and accordingly it has been annexed to the eighth and last edition of that work. In Feyjoo's "Cartas Eruditas y Curiosas," 4to. 5 tom. Madrid 1781, there is a dissertation on remedies for the memory, and one on the art of memory. In another essay, the principles of the art are stated to consist in particular places and images, and a sphere or globe is divided into various compartments. In a section of this essay, Feyjoo speaks of remembering certain words by the means of images, and in another section he illustrates the application of the art to poetry. Since the posthumous publication of these essays, the author having died in 1765, after having been with difficulty saved from the horrors of the Inquisition, for the freedom of his censures on the licentiousness of the clergy, and the superstitions of the Romish church, (see FEYJOO,) no mention of the local and symbolical memory occurs until the year 1806, when it was announced in the "Philosophical Magazine," (vol. xxvi. p. 282.) that the study of the science of mnemonica was revived in Germany. In 1807, M. Gregor Von Feinaigle, a native of Baden, visited Paris, and delivered lectures on his "New System of Mnemonics and Methodics."

In 1811, M. Feinaigle visited England; and in June of that year he obtained leave from the managers of the "Royal Institution" to exhibit to the public an experiment of the efficacy of his method "of facilitating and assisting memory."—"Four children, two boys and two girls, all under 14 years of age, had been put under M. Feinaigle's care but two or three days before: he had one of the girls but an hour and a half; and the longest tuition that any of them had received was but four hours and a half.—One of them repeated Goldsmith's Hermit backward and forward, and stated the stanza, the line, and the order of any remarkable word required of him.—One little girl answered to questions in the chronology of the Roman emperors; and another multiplied, without slate or paper, two sums of eight figures by eight, and declared that she had not previously been taught arithmetic.—A boy determined the geographical

cal situation, in degrees and minutes, of 50 different cities; and on a planisphere chalked out on a board, marked down the true situation of places named to him.—Mr. Fincher, of the Institution, also recited the mineralogical tables of Linnæus, the second part of which he had taught himself on M. Feinaigle's system, together with the first part of Briffon's ornithologic system; and he declared, from his own experience, that the principles of M. Feinaigle's art were equally calculated to give facility in the acquisition, and certainty in the retention, of the tables of any other science—a fact which was confirmed by several gentlemen present, who have attended the private courses of the professor."—M. Feinaigle has since that time repeated his exhibitions at Liverpool, in Scotland, and in London, to the astonishment of many persons who attended.

Locality, or the connection of our ideas with places, as we are informed by the anonymous author, whose treatise we have cited, is made the foundation of this system. In this respect, it is analogous to the scheme of mnemonics practised by the ancients, but it is here applied much more extensively and advantageously than it was by them. How far it deserves this commendation, the reader who is desirous of farther information concerning it will be informed by consulting the treatise already quoted; in which, as we conceive, there is a just development of the principles of M. Feinaigle; but the detail is so extensive and so incapable of abridgment, that it would be inconsistent with our limits to enlarge, so as to give any satisfaction to our readers. The general principle of this art is that of dividing walls and houses into different compartments, and annexing numbers to them in a particular order, or words together with the numbers; the recollection of these words being assisted by associating some idea of relation between the objects and their situation. Consonants are also annexed to the figures, which letters are not merely arbitrary, but adapted as nearly as possible to the form of the figures. These letters, and the figures which they are intended to represent, should be impressed strongly on the memory, as the consonants must be converted into words by the introduction of vowels. To each word should be affixed some striking idea; and the objects that are selected, each of which is expressed by a word, must be arranged in different places, beginning with the floor, and proceeding to the first, second, and third wall, &c. Having divided a room into parts, as the floor and walls, subdivided these into places, changed figures into letters, and formed words, we shall by these means be enabled to remember a series of figures or things. For this purpose, it would be advantageous to fix upon some room to which we have been accustomed. If this room should have been hung with pictures, engravings or plans, or ornamented with busts, &c. the remembrance of places, or localities, will be facilitated. The order of things in a room will be familiar to us. The squares or places may be filled with some pictures of our own drawing, and it will be as easy to remember the symbols, or hieroglyphics, as to remember the situation or place of any picture, or article of furniture in a room. By supposing the floor to be constructed of mosaic, instead of being covered with a carpet, we shall have spaces for symbols. The outlines of the symbols are intended to represent, as accurately as possible, the various figures in the two rooms, to which our plan extends, so that they may be permanently fixed in our memory. How these symbols are made applicable to chronology, history, &c. requires a more diffuse detail than our limits will allow. Having already given our opinion of the various artifices that have been devised for aiding the memory, it is needless to enlarge. The reader will perceive that it must

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require time and labour, and no inconsiderable exertion of memory, to derive any advantage from mechanical modes of aiding the exercise of it.

Under the article MEMORY, we have given some examples of extraordinary retentiveness in the use of this faculty. To those already mentioned, we shall here add some others. See AVICENNA, FULLER, JEWEL, and SCALIGER.

Lipsius remembered the whole history of Tacitus, and pledged himself to recite it word by word, or any passage that might be required. Francis Suarez could repeat all St. Augustine's works by heart, alleging particular lines and words, with the volume and page in which they occurred. Magliabecchi had a surprising memory. A gentleman who wished to try it, lent him a MS. which he was going to print, and soon after it was returned, the author came to him with a melancholy aspect, and pretended it was lost. Magliabecchi being requested to recollect as much of it as he could, wrote the whole without missing a word, or making any variation in the spelling. We have mentioned some extraordinary instances of the power of memory possessed by Jedediah Buxton under his article. Without the assistance of pen, ink, chalk, or any other mark, he could multiply five or six figures by as many, or divide as large sums off hand, in less time than the most expert arithmeticians could perform their operations. Being asked how many cubical $\frac{1}{4}$ ths of an inch were contained in a body, whose three sides were 23145789 yards, 5641732 yards, and 54965 yards; after about five hours, in the midst of more than 100 of his fellow labourers, he computed the result; and gave it in a line of 28 figures, without the least hesitation or mistake. He would repeat his answers to difficult questions a month or two after he had solved them. Of his own accord he calculated how much one farthing doubled 140 times would amount to; and the answer was set down from his lips in 39 places of pounds, and an odd 2s. 6d. Being once asked how many barley corns would reach eight miles; he answered, in $1\frac{1}{2}$ minute, 1520640 barley corns. In 13 minutes he computed, that the distance of York from London, being 204 miles, a coach-wheel, whose circumference was six yards, would turn round in that interval 59,840 times. By the strength of his memory he multiplied 39 figures by 39 figures, and had no recourse to pen, ink, or paper.

At the moment of writing this article, the editor is informed of a boy, from Vermont in America, not eight years of age, who performs wonders in extempore calculation. The rapidity and correctness with which he multiplies and divides large numbers, with which he finds all the factors of a composite number, and whether any number proposed be prime or not, and with which he solves a variety of arithmetical questions that are proposed to him, are truly astonishing.

The editor has been favoured by F. Baily, esq. of Gray's Inn, an eminently competent judge of those performances in which this boy excels, with the following account. His name is Zerah Colburn. He was born at Cabut, a town lying at the head of Onion river, in Vermont, America, on the 1st of September 1804. He began to manifest his extraordinary powers in August 1810, when he was not six years of age; though he had derived no other advantage from education beyond what was to be obtained at a small school in a remote part of the country. On the 12th of May 1812 he arrived in this country, and has since exhibited his astonishing performances to a great number of spectators, and before many persons of the first eminence for mathematical and philosophical knowledge.

At a meeting of his friends, which was held for the purpose

pose of concerting the best method of promoting the views of the father, this child undertook, and completely succeeded in, raising the number 8 progressively up to the sixteenth power; and in naming the last result, viz. 281,474,976,710,656, he was right in every figure. He was then tried as to other numbers, consisting of one figure; all of which he raised (by actual multiplication and not by memory) as high as the tenth power, with so much facility and dispatch, that the person appointed to take down the results was obliged to enjoin him not to be so rapid. With respect to numbers consisting of two figures, he would raise some of them to the sixth, seventh, and eighth power; but not always with equal facility: for the larger the products became, the more difficult he found it to proceed. He was asked the square root of 106929; and before the number could be written down, he immediately answered 327. He was then required to name the cube root of 268,336,125; and with equal facility and promptness he replied 645. Various other questions of a similar nature, respecting the roots and powers of very high numbers, were proposed by several of the gentlemen present; to all of which he answered in a similar manner. One of the party requested him to name the factors which produced the number 247483, which he immediately did by mentioning the two numbers 941 and 263; which indeed are the only two numbers that will produce it. Another of them proposed 171395, and he named the following factors as the only ones that would produce it; viz. 5×34279 , 7×24485 , 59×2905 , 83×2065 , 35×4897 , 295×581 , and 413×415 . He was then asked to give the factors of 36083; but he immediately replied that it had none; which in fact was the case, as 36083 is a prime number. Other numbers were indiscriminately proposed to him, and he always succeeded in giving the correct factors, except in the case of prime numbers, which he discovered almost as soon as proposed. One of the gentlemen asked him how many minutes there were in forty-eight years; and before the question could be written down, he replied 25,228,800: and instantly added, that the number of seconds in the same period was 1,513,728,000. Various questions of the like kind were put to him; and to all of them he answered with nearly equal facility and promptitude; so as to astonish every one present, and to excite a desire that so extraordinary a faculty should, if possible, be rendered more extensive and useful.

Being asked to inform the gentlemen present how he was enabled to answer, with such facility and correctness, the questions that were proposed to him, he declared that he did not know how the answers came to his mind. It was observed, however, that the child performed his several operations by some rules known only to himself. The discovery was made in one or two instances, when he had been closely pressed upon that point. In one case he was asked to tell the square of 4395; he at first hesitated, fearful that he should not be able to answer it correctly: but when he applied himself to it, he said it was 19,316,025. On being questioned as to the cause of his hesitation, he replied that he did not like to multiply four figures by four figures: but, said he, "I found out another way; I multiplied 293 by 293, and then multiplied this product twice by the number 15, which produced the same result." On another occasion, his highness the duke of Gloucester asked him the product of 21,734 multiplied by 543: he immediately replied 11,801,562: but, upon some remark being made on the subject, the child said that he had, in his own mind, multiplied 65202 by 181. Now, although in the first instance it must be evident to every mathematician that $4395^2 = (293)^2 \times$

$(15)^2$; and further, that in the second case 543 is equal to 181×3 , and consequently that $21734 \times (181 \times 3) = (21734 \times 3) \times 181$; yet, it is not the less remarkable that this combination should be immediately perceived by the child, and we cannot the less admire his ingenuity in thus seizing instantly the easiest method of solving the question proposed to him.

Amongst a variety of cases of this kind, the following singular instance is particularly worthy of being recorded. He was asked to tell the square of 999999: which, after some little time, he stated to be 999,998,000,001; and he further observed, that he had produced this result by multiplying the square of 37037 by the square of 27. He then, of his own accord, multiplied that product by 49; and said that the result (viz. 48,999,902,000,049) was equal to the square of 6,999,993. He afterwards multiplied this product by 49; and observed that the result (viz. 2,400,995,198,002,401) was equal to the square of 48,999,951. He was again asked to multiply this product by 25; and in naming the result (viz. 60,024,879,950,060,025) he said that it was equal to the square of 244,999,755. These astonishing efforts of his mind require no comment; and sufficiently shew that he possesses a more intimate knowledge of the science of numbers than can be obtained by the ordinary, or even more abstruse rules of arithmetic.

It is well known to mathematicians, that Fermat had asserted that $2^{32} + 1 = 4,294,967,297$ was a prime number; but Euler detected that error, by discovering that it was equal to $6,700,417 \times 641$. The same number was proposed to this child, who (after a lapse of some weeks) found out the factors by the mere operation of his mind: and the method which he took to obtain his object, clearly shewed that he had not derived his information from any other source.

MNEMOSILLA, in *Botany*, a genus of Forskall's, which, according to Jussieu, is the same as *HYPERCOUM*. See that article.

MNEMOSYNE, in *Mythology*, was the daughter of *Cœlus* and *Terra*, according to the theogony of Hesiod; and Jupiter being enamoured of her, made her mother to the nine Muses. To Mnemosyne is ascribed, according to Diodorus Siculus, the art of reasoning, and giving suitable names to every being, so that we can describe them, and converse about them without seeing them. Mnemosyne is generally allowed to have been the first who used helps for the memory, and this is intimated in her name.

MNETHEL, in *Geography*, a town of Persia, in the province of Chusistan; 102 miles E. of Sulter.

MNEVIS, in *Mythology*, the name of a sacred bull, consecrated to the sun, and worshipped by the Egyptians at Heliopolis. The worship of Mnevis gradually disappeared, when Apis became the general deity of the country. From the era in which Cambyles overthrew the magnificent temple of Heliopolis, we may date the downfall of the worship of Mnevis. This Mnevis was, according to Bryant, a compound of Men-nevas, the lunar god Nevas, the same as Noas, or Noah. The name relates to the same person who, in Crete, was styled Minos; and the same also who was represented under the emblem of the Men-taur or Mino-taurus. *Ant. Myth.* vol. ii. p. 416, &c.

MNIARUM, in *Botany*, so called from *μνίαιος*, mossy, in allusion to its habit. *Forst. Gen.* 1. t. 1. *Linn. Suppl.* 18. *Schreb.* 9. *Willd. Sp. Pl.* v. 1. 30. *Mart. Mill. Dict.* v. 3. *Juss.* 441. *Brown Prodr. Nov. Holl.* v. 1. 412. *Labill. Nov. Holl.* v. 1. 8. (*Ditoca*; *Gærtn.* t. 126.)—*Class and order, Monandria Digynia. Nat. Ord. Holeraceæ, Linn. Atriplices, Juss. Chenopodiis affinia, Brown.*

Gen. Ch. *Cal.* Perianth inferior, pitcher-shaped, permanent, cut half way down into four equal, erect, obtuse, rigid segments. *Cor.* none. *Stam.* Filament one, capillary, erect, inserted into the mouth of the calyx, scarcely longer than its segments; anther roundish, furrowed. *Pist.* Germen superior, oval; styles two, thread-shaped, gradually divaricated, the length of the stamens; stigmas simple. *Peric.* none. *Seed* solitary, small, oblong, with a membranous coat, enclosed in the hardened tube of the calyx.

Ess. Ch. Calyx pitcher-shaped, four-cleft. Corolla none. Seed one, enclosed in the tube of the calyx.

Akin to *Scleranthus*, from which it differs in the stamens being, for the most part, solitary; the calyx four-cleft; and the stalks two-flowered, with four bracteas at the summit. The seed in both genera is inverted, the embryo curved round the albumen, the radicle superior. *Brown.*

1. *M. biflorum*. Linn. Suppl. 81. Forst. Prodr. 2. Comm. Goett. v. 9. 19. t. 1. (*M. pedunculatum*; Labill. Nov. Holl. v. 1. 8. t. 2. *Ditoca muscosa*; Gært. v. 2. 196. t. 126. f. 1.)—Stem tufted. Branches very smooth. Leaves finely toothed at the base only, shorter than the fruit-stalks. *Br.*—Native of New Zealand, Terra del Fuego, and Van Diemen's land. The stems compose dense massy tufts, varying in height, with the aspect of a *Minuartia*. Every part of the herb is smooth. Leaves opposite, awl-shaped, united and finely toothed at the base; otherwise entire. *Flower-stalks* axillary, solitary, simple, at first short, but subsequently elongated beyond the leaves; each bearing a pair of minute sessile greenish flowers, accompanied by four little ovate bracteas. The calyx of the fruit is hardened, tumid, ovate, closed about the seed, and crowned with its own little permanent segments.

2. *M. fasciculatum*. Br. n. 2.—“Stems procumbent, branched. Branches minutely downy. Leaves finely toothed throughout. Fruit-stalks scarcely so long as the leaves.”—Gathered by Mr. Brown in Van Diemen's land.

MNIUM, a word adopted by Dillenius from the Greeks, whose *μνιον* is synonymous with Mosses. He therefore chose it for one of his own genera of Mosses, the character of which is to have two different kinds of heads, or fructification; the one powdery and naked, that is, destitute of calyx as well as of capsule; the other of the same capsular nature as in *Bryum* and *Hypnum*. Considering this character as sufficient to distinguish *Mnium* from all other Mosses, he proceeds to inquire into the nature of these different parts of fructification. In his conclusion he mistakes the male for the female, though his error has not commonly been observed, because he terms capsule what he believed to be the anther, but which is indeed the capsule, properly so called. (See DILLENIIUS and MUSCI.) We therefore now resume the language, though we discard the ideas, of this eminent writer.

Dillenius, considering every moss as a *Mnium* in which he met with a powdery head, although he did not detect the capsule, has made eight species; but this principle has widely misled him. His fifth and sixth species are *Jungermannia*, his seventh is the *Blasia pusilla*, previously well defined, as a distinct genus, by Micheli. In the rest of his species, Dillenius is as correct as any person could, at that time, be.

Linnæus, following up the principle he had adopted from Dillenius, referred to *Mnium* every moss, with a terminal fruit-stalk, in which the powdery head of male flowers, supposed by them female, had been observed. As his followers proceeded to look more and more closely into the structure of these minute vegetables, the powdery heads, or stamens, as they were termed when surrounded by leaves, were

discovered in many species, hitherto referred to *Bryum*. Nor is this wonderful, for the discoveries of Hedwig have proved them essential to every moss, they being unquestionably the male flowers. For a long time botanists were perpetually disputing, whether to refer particular species to *Mnium* or *Bryum*, according as they had met with the powdery head or not. Hudson alone has shewn his judgment, in considering the naked or leafless head as proper to the former; by which, except the original blunder respecting two or three *Jungermannia*, he has preserved himself from error. Hedwig has confused the subject by reversing the original characters. His *Bryum* has a round or capitate male flower, or powdery head; his *Mnium* a flat or discoid one. This leads to no natural character. Indeed the difference itself is uncertain, the part in question varying in convexity at different periods of growth. The ablest botanists who have in general followed Hedwig, as Schreber, Swartz, and Roth, well aware of his mistake in this instance, thought to correct it, by uniting the two genera into one, under the name of *Bryum*. Hoffmann, more boldly but less successfully, recurred to the fringe alone, making almost every terminal-fruited moss with a single fringe *Bryum*, with a double one *Mnium*. See FRINGE of Mosses.

The writer of the present article at length proposed to distinguish *Mnium* by the longitudinal furrows of its capsule, which in another double-fringed genus, *Bartramia*, had been found a certain and clear mark of difference. This character keeps the original real *Mnia* of Dillenius together, except the first, which is the *Tetraphis pellucida*; and has the advantage of associating with them most naturally the *Arthropodium* of Hedwig, a genus whose distinction was founded by its author on the axillary, not terminal, male flowers; a character which the slightest attention to mosses will shew to be of no importance, as to generic discrimination. *Mnium* is therefore now defined as follows. Tr. of Linn. Soc. v. 7. 261. Fl. Brit. 1344.

Ess. Ch. Capsule cylindrical, at length furrowed. Outer fringe of sixteen tapering teeth; inner a lacinated membrane. Veil smooth. Flowers terminal.

The furrows are always sixteen, being equal in number to the teeth of the outer fringe, and indeed to the principal segments of the inner one. Six species are defined in the Transactions of the Linnæan Society above quoted.

1. *M. androgynum*. Narrow-leaved Spring-moss. Linn. Sp. Pl. 1574. Sm. Fl. Brit. 1344. Engl. Bot. t. 1238. Hedw. Theor. 149. t. 12. f. 48—50. (*M. perangustum et brevibus foliis*; Dill. Musc. 230. t. 31. f. 1. *Bryum androgynum*; Hedw. Sp. Musc. 178. Turn. Musc. Hib. 11.)—Monoecious. Capsule straight. Lid conical. Leaves imbricated every way, spreading; toothed at the point.—Native of moist shady boggy places throughout Europe, flowering in March. The capsules, which ripen in April or May, are very rare. The stems form dense perennial tufts, and are branched, clothed with bright green, dotted, pellucid, lanceolate, single-ribbed, acute leaves; toothed towards the point; entire and revolute below. *Flowers* terminal; the male in little round stalked heads; female on the same plant, sessile. *Capsule* nearly upright, on a shining red stalk an inch long. *Lid* short, conical, blunt, striated, a little curved.

2. *M. conoideum*. Club-fruited Spring-moss. Sm. Fl. Brit. 1345. Engl. Bot. t. 1239. (*Bryum conoideum*; Dickf. Crypt. fasc. 4. 9. t. 11. f. 2. Turn. Musc. Hib. 112. *Grimmia*? Forsteri; Sm. Fl. Brit. 1196. Engl. Bot. t. 2225. *Bryum Forsteri*; Dickf. Crypt. fasc. 3. 4. t. 7. f. 8.)—Monoecious? Capsule straight, obovate. Lid awl-shaped. Leaves imbricated every way, spreading, entire.—Native of

the trunks of trees in Scotland and Ireland, but rare. Smaller than the former. The *stems* compose small, convex, perennial patches, and are mostly simple, leafy, half an inch high. *Leaves* oblong, entire, pale green, single-ribbed, pointless, dotted just as in the foregoing. *Male flowers* unknown. *Fruit-stalks* solitary, terminal, half an inch high. *Capful* obovate, with a curved lid, of nearly its own length. The more we consider the matter, the less doubt have we respecting the above synonymy.

3. *M. palustre*. Greater Forked Spring-moss. Linn. Sp. Pl. 1574. Sm. Fl. Brit. 1346. Hedw. Sp. Musc. 188. Schmidel. Ic. 218. t. 56. f. 2. (*M. majus*, ramis longioribus bifurcatis; Dill. Musc. 233. t. 31. f. 3, 4. Bryum palustre; Engl. Bot. t. 391. Turn. Musc. Hib. 113.)—Dioecious. *Capful* oblique. Lid conical. Leaves acute; the upper ones curved to one side. Stem erect, forked.—Native of bogs, about mountain rivulets, and in various watery situations throughout Europe; flowering in April and May; fruiting in June and July. The *stems* are three or four inches high. *Leaves* of a light yellowish-green, lanceolate, acute, channelled, single-ribbed, entire; wavy when dry. *Male flowers* like a broad disk, surrounded with radiating leaves; often proliferous, throwing up stalked round heads, like the male flowers of the first species; *female* sessile. *Fruit-stalks* solitary between the new shoots of the season, two or three inches high, wavy, red below. *Capful* curved, with a short conical lid.

4. *M. reclinatum*. Procumbent American Spring-moss. Sm. Tr. of Linn. Soc. v. 7. 262. (*M. ramis brevibus, inordinatè progredientibus*; Dill. Musc. 239. t. 31. f. 8.)—Dioecious. *Capful* nearly erect. Lid conical. Leaves bluntish, rather turned one way. Stem procumbent, much branched.—Gathered by Mitchell in bogs in Virginia. *Dillenius*. Its colour and habit are like the last, but the size only half as great. *Capful* slender, nearly erect. Stem much branched, not forked. *Male flowers* stalked, naked.

5. *M. pendulum*. Pendulous-fruited Spring-moss. Sm. n. 5.—*Capful* pendulous. Lid nearly flat. Leaves awl-shaped, striated, recurved. Stem erect.—Gathered by Mr. Menzies, in New Zealand. *Stems* determinately branched, leafy, clothed with rusty down, like many mosses that grow in clear springs. *Leaves* yellowish, single-ribbed, imbricated every way, but recurved, chiefly toward one side. *Fruit-stalks* red, two inches high. *Capful* cylindrical, or somewhat bell-shaped, chestnut-coloured. Lid flat, with a central knob.

6. *M. arrhenopterum*. Axillary Spring-moss. Sm. n. 6. (*Arrhenopterum heterostichum*; Hedw. Sp. Musc. 198. t. 46. f. 1—9. Bryum heteropterum pellucidum; Dill. Musc. 352. t. 45. f. 11; but indifferent. *B. foliis membranaceis obtusis*; Dill. Musc. 552. t. 35. f. 19; better; both determined by the Dillenian herbarium. Hypnum illecebrum; Linn. Sp. Pl. 1594; excluding the synonym of Dillenius. Fl. Lapp. ed. 2. 329.)—*Capful* inclining. Lid awl-shaped. Leaves elliptical, obtuse. Stem erect. Native of Virginia, Pennsylvania and Lapland.—*Stems* about two inches high, branched. *Leaves* imbricated, pale whitish-green, elliptical, concave, shining, single-ribbed, serrated at the end. *Fruit-stalks* an inch long, straight, rather stout. *Capful* curved, with a beaked red lid.

There appear to be several species still referrible to this genus, which are not as yet any where described.

MO, in *Geography*, a town of Sweden, in Helshingland; six miles W. of Soderhamn.

MOA, an island in the East India sea, about 30 miles long and 10 broad. S. lat. 8° 21'. E. long. 127° 45'.

MOAB, *Land of*, or MOABITIS, so called from Moab one of the incestuous sons of Lot, in *Ancient Geography*, was situated in Arabia Petræa, on the north of Midian, having the river Arnon on the west, which divided it all the way from the tribe of Reuben, the Ishmaelites on the east, and the land of Gilead on the north. Their country was at first inhabited by the gigantic Emims, whom they expelled, making themselves masters of it, and of all its cities, which were both numerous and considerable. Some of these cities, mentioned by Josephus, were on the other side of the Arnon, and therefore not so properly in Moabitis, as in the land of the Amorites, or Reubenites; particularly Heshbon; but they might have been inhabited by the Moabites. The limits of this country, indeed, were continually fluctuating; so that we read of the plains of Moab, called also by Moses the land of Moab; but which had been taken by Sihon, quite as far as the river above mentioned. Mount Nebo is placed by Moses in the land of Moab, though seated on the other side of the Arnon, in the kingdom of Sihon. This river, however, seems to have been the proper northern boundary between these two kingdoms, as Moab seems to have been the southern boundary between Arabia Petræa and Deserta. See MOABITES.

MOAB, in *Geography*, a town of Arabia, in the province of Hadramaut; 83 miles W. of Hadramaut.—Also, a town of Arabia Felix, in the province of Yemen, and residence of the prince, built in 1708, and situated between Damar and Sanaa.

MOAB, or *El-Raba*, a town of Syria; 50 miles S.E. of Jerusalem.

MOABITES, in *Ancient History*, the descendants of Moab, the son of Lot, by his eldest daughter. The posterity of Lot settled in the country bordering on the mountain, where he was born, which some make part of Cœlefyria, while others allege that it belongs to Arabia; and having driven out the old inhabitants, they possessed a small tract called Moabitis, or the land of Moab. (See MOAB.) They were governed by kings, practised circumcision, and employed themselves mostly in pasturage and breeding cattle, which constituted their chief wealth. It is probable that their language was a dialect of the Canaanitish or Hebrew. They had once the knowledge of the true God, and retained it till the time of Moses, even after they had very much corrupted their religion by introducing the worship of false gods. The idols of the Moabites, mentioned in scripture, were Chemosh and Baal-Peor. Some suppose that these were different names of the same idol; but others think that Baal-Peor was Bacchus, and Chemosh seems to have been a different idol. In the practice of their religious rites, they sacrificed both in the open air, on mountains dedicated to that service, and in temples built for their idols in the cities: besides oxen and rams, they offered on extraordinary occasions human victims, according to the Phœnician custom.

The first inhabitants of the country were a gigantic race, called Emims, or Terribles, probably descendants of Ham. These were expelled by the Moabites; but the latter in process of time lost that part of their land which lay to the N. of the river Arnon. When the Israelites, after the death of Othniel, returned again to idolatry, Eglon, king of Moab, was an instrument in punishing them; he invaded Israel and kept the Israelites in subjection eighteen years. Ehud, having secretly put Eglon to death, was obliged to make his escape beyond Jordan; and there he assembled a body of forces, who attacked the Moabites, and slew 10,000 of their best men. By this disaster the power of the Moabites was broken, and the Israelites were freed from the yoke

of that nation. Notwithstanding the protection which the king of Moab afforded to the parents of David and to David himself, when he was persecuted by Saul, as soon as he came to the crown the Moabites entered into a confederacy against him; but in consequence of a signal victory which he obtained over them, many of them were put to the sword, and the rest became his vassals and tributaries. From this time they continued subject to Solomon and Rehoboam, until the revolt of the ten tribes, upon which they became tributaries to the kings of Israel, though they had kings of their own, who were little better than viceroys. After the death of Ahab, Mesha, king of Moab, rebelled against his son Abaziah, but the short reign of this prince not permitting any attempt to reduce him, his brother and successor Jehoram, assisted by Jehoshaphat, king of Judah, and the king of Edom, his tributary, made an expedition for this purpose; the result of which was, the defeat of the Moabites and the desolation of a great part of their country. It was not long before the Moabites, entering into an alliance with the Ammonites, the Edomites of mount Seir, and other neighbouring nations, attempted to revenge the losses they had sustained in this invasion of their country on Jehoshaphat, king of Judah, who had encouraged Jehoram to undertake it. Their attempt proved unsuccessful, and terminated in their total ruin. After this period the Moabites do not seem to have disturbed Israel for many years. On the declension of the kingdom of Israel, they seem to have retaken from the tribes of Reuben and Gad a great part of the land which formerly belonged to them, before the invasion of Sihon; but elated by their success, they behaved with pride and insolence, in consequence of which several of the ancient prophets, and Isaiah in particular, threatened them with utter destruction. After the dreadful discomfiture of the army of Sennacherib, the son of Shalmaneser, the Moabites often revolted from his successors, and were as often reduced, till they were entirely subdued by Nebuchadnezzar; but upon Nebuchadnezzar's departure from Judea and Syria, after his second expedition into these parts, they, with the other neighbouring nations, proposed to Zedekiah to enter into a league against the Chaldeans, to which that prince consented, on the accession of the Egyptians to their confederacy; but this measure, adopted by Zedekiah against the remonstrance of the prophet Jeremiah, became the occasion of his utter ruin; for his new allies deserted him in his distress. From this period history makes little mention of the Moabites, who became subject to the great empires, and at length coalesced as one people with the neighbouring nations which inhabited the deserts of Syria; so that, although Josephus mentions the Moabites as a distinct nation long after, observing that they were subdued by Alexander Jannæus, king of the Jews, and that in his time they were a numerous nation; yet, in the third century after Christ, they had lost their ancient name, and were comprehended under the more general denomination of Arabians. *Anc. Un. Hist.* vol. i.

MOAGANORE, in *Geography*, a town of Hindoostan, in Golconda; 10 miles N.W. of Rachore.

MOAGAS, a cluster of small islands in the Caribbean sea, near the coast of South America, at the entrance of the gulf of Venezuela: they are eight or nine in number, extending from north to south, and but one excepted, low, flat, and covered with trees. The southernmost is the largest.

MOAMAA, a port and good harbour of Nubia, in the Red sea; 15 miles S. of Aidab.

MOANESS, a cape on the N. coast of the island of Shetland. N. lat. $60^{\circ} 44'$. W. long. $1^{\circ} 32'$.

MOANGUNGE, a town of Bengal; 72 miles N.N.W. of Dacca.

MOAR, a town of Hindoostan, in Bahar; 22 miles N.E. of Bahar.

MOAR-LOVRE, in *Agriculture*, a term made use of by some to express a peculiar distemperature of corn, a sort of blight. In this case the earth is said to sink away from the roots of the corn, and to leave the plants standing in a great part above the ground with naked roots; which are too weak to support the stalks: the plants, of course, fall down, and the ears become light. It is a distemper peculiar to corn growing on light and loose lands, which Mr. Tull has mentioned in his *Horse-hoeing Husbandry*. And it is supposed that the best remedy is to bring up mould against the rows, when they are strong enough to bear it, and it is fine and dry; the motion of the stalks with the wind draws in this loose powdery mould, and it spreads equally, settles about the roots, and covers them so as to produce fresh nourishment and support.

MOAT, in *Fortification*, a deep trench dug round a town or fortress to be defended, on the outside of the wall, or rampart. See *Plate VII. Fortif. fig. 1. lit. b, b, b, &c.*

The depth and breadth of a moat often depend on the nature of the soil; according as it is marshy, rocky, or the like. The brink of the moat next the rampart in any fortification is called the *scarp*, and the opposite one the *counter-scarp*. See *DITCH*.

MOAT, Dry, is that which is destitute of water: this ought to be deeper than one which is full of water.

MOAT, Lined, is that whose scarp and counterscarp are cased with a wall of mason's work lying aslope.

MOAT, Flat-bottomed, is that which hath no sloping, its corners being somewhat rounded.

MOAT, Angle of the. See *ANGLE*.

MOATAZALITES, **MOTAZALITES**, or *Separatists*, a religious sect among the Turks, who deny all forms and qualities in the divine Being: or who divest God of his attributes.

There are two opinions among the Turkish divines concerning God. The first admits metaphysical forms, or attributes; as, that God has wisdom, by which he is wise; power, by which he is powerful; eternity, by which he is eternal, &c.

The second allows God to be wise, powerful, eternal; but will not allow any form or quality in God, for fear of admitting a multiplicity.

Those who follow this latter opinion are called *Moatazalites*: they who follow the former, *Sepphalites*.

The Moatazalites also believed that the word of God was created in *subjeeto*, as the schoolmen term it, and to consist of letters and sound; copies thereof being written in books to express or imitate the original; they denied absolute predestination, and affirmed that man is a free agent. They held that if a professor of the same religion be guilty of a grievous sin, and die without repentance, he will be eternally damned, though his punishment will be lighter than that of the infidels. Moreover, they denied all vision of God in paradise by the corporeal eye, and rejected all comparisons or similitudes applied to God. This sect is said to have first invented the scholastic divinity, and is subdivided into no less than twenty inferior sects, which mutually brand one another with infidelity. Of these the most remarkable are the Hodelians, the Jobbaisians, the Hashemians, the Nodhamians, the Hayetians, the Jahedhians, the Mozdarians, the Bacharians, the Thamamians, and the Kadarians. *Sale's Prelim. Disc.* p. 159, &c.

MOATE, or **MOATE GRENOGUE**, in *Geography*, a post-town,

town, or rather village in the county of Westmeath, Ireland. It is 52 miles W. by N. from Dublin, and $7\frac{1}{2}$ from Athlone.

MOAWIYAH, in *Biography*, sixth caliph of the Arabians, was the son of Abu Sofian, a chief of Koreish, and an eminent commander under Mahomet. Moawiyah was appointed secretary to the prophet, an office which he filled for several years, but after the conquest of Syria, he was made governor of the province of Omar, and was continued in that high station by Othman. He obtained great success against the Greek emperors, and, in 654, he conquered the isle of Rhodes, and demolished the famous colossus of the sun. In the following year he became a competitor for the caliphate, but Ali was elected; Moawiyah instantly declared against him, and prevailed upon Amru to join him. He was proclaimed caliph at Mecca and at Medina, and maintained a civil war against Ali, till the assassination of that caliph in 660. Moawiyah was, at the same time, severely wounded by one of the three conspirators who undertook to restore peace among the Mussulmans by the assassination of the two rivals, but he escaped with his life. At first, Hassan, Ali's son, opposed the pretensions of Moawiyah, but soon resigned his power to his opponent, who obtained the caliphate without a rival in 661, being the first prince of the dynasty of the Ommiyans. An insurrection of the Kharegites was one of the first events of his reign, which was quelled by the people of Irak, with the total extermination of the sect. A reconciliation with his illegitimate brother Ziyad, a man of great talents, who had taken the part of Ali, and was made governor of Persia, added great strength to the throne of Moawiyah, who, to gain him, did not scruple to violate the laws of the Koran, by acknowledging him as the blood of the Koreish, though his legal father was a Greek slave. The temper and severity of Ziyad was of great service in suppressing some commotions which threatened to disturb the peace of the empire. In 668, Moawiyah sent his son Yezid with an army to besiege Constantinople, but the undertaking was beyond the Mussulman power, and after spending seven years in a series of repeated summer attacks, attended with a variety of petty events, but signalized by no great action, they relinquished the enterprize. The caliph's arms were more successful in another quarter, and obtained for him the complete possession of Samarcand. Moawiyah fixed his residence at Damascus, and the great object of his latter years was to secure the crown to his son Yezid, who was by no means fitted for the high rank to which he aspired. Moawiyah, after a long struggle with the people, procured the public recognition of Yezid as his own colleague, and presumptive heir to the caliphate. In a very short time after this he expired at Damascus, after a reign of about twenty years, and when he had attained to the age of seventy-five. He was, says his biographer, the most eminent of the Saracen caliphs, and extolled for his capacity, courage, generosity, and clemency. He was the first of the caliphs who wore rich garments, and affected royal splendour. He was a patron of learning, particularly of those who were proficient in poetry. Univer. Hist.

MOBARACGUNGE, in *Geography*, a town of Hindoostan, in Oude; 14 miles W. of Fyzabad.

MOBAS, a town of New Mexico, in the province of Hiaqui; 25 miles S.E. of Riochico.

MOBILE, MOVEABLE, any thing susceptible of motion, or that is disposed to be moved either by itself, or by some other prior mobile, or mover.

MOBILE, *Primum*, in the *Ancient Astronomy*, was a ninth

heaven, or sphere, imagined above those of the planets, and fixed stars.

This was supposed to be the first mover, and to carry all the lower spheres round along with it; by its rapidity communicating to them a motion by which they revolved in twenty-four hours. But the diurnal revolution of the planets is now accounted for, without the assistance of any such *primum mobile*.

MOBILE, *Perpetuum*. See *Perpetual MOTION*.

MOBILE, in *Geography*, a large, navigable river of America, formed by two main branches, the Alabama, and the Tombekbee, in the S.W. part of Georgia, just below a considerable island, the S. point of which is in about N. lat. $31^{\circ} 26'$, and W. long. $87^{\circ} 55'$. Pursuing a S. course into West Florida, the confluent stream enters the gulf of Mexico at Mobile Point in N. lat. $30^{\circ} 17'$, 11 leagues below the town of Mobile. Large vessels cannot approach the town within the distance of seven miles: the breadth of the bay is in general about three or four leagues. Alligators of a large size and in great number bask on the shores, as well as swim in the rivers and lagoons. The course of this river from the N.E. source of the waters of the Alabama to Mobile Point is estimated at about 460 miles. Large boats can navigate 350 miles, and canoes much farther.

MOBILE, a city of West Florida, formerly important and splendid, but now in a state of decline. Its figure is oblong, and it is situated on the W. bank of the river. The bay of Mobile terminates a little to the N.E. of the town in marshes and lagoons, which subject the inhabitants to fevers and agues in the hot season. The town contains several elegant houses, occupied by French, English, Scotch, and Irish. Fort Conde, situated near the bay, towards the lower end of the town, is a regular fortress of brick; and there is a neat square of barracks for the officers and soldiers. Mobile, when possessed by the English, sent yearly to London skins and furs to the value of from 12 to 15,000*l.* sterling. It surrendered to the Spanish forces in 1780.

MOBILE, *Mobiles*, plural, in the *Ancient Greek Music*, the moveable or central sounds of each tetrachord, such as were tuned differently in different genera; whereas the two extremes, or the lowest and highest sound of each genus, were fixed: *soni stantes*. See *TETRACHORD*, *GENUS*, and *SOUND*.

MOBILIA BONA, in the *Civil Law*, are what in common law, &c. we call *moveables*, or *moveable goods*.

MOBILITY, in the *Schools*, &c. an aptitude or facility to be moved.

The hypothesis of the mobility of the earth is the most plausible; and is that universally admitted by the later astronomers. Pope Paul V. appointed commissioners to examine the opinion of Copernicus touching the mobility of the earth. The result of their enquiry was, a prohibition to assert, not that the mobility was possible, but that it was actually true: that is, they allowed the mobility of the earth to be held as an hypothesis, which gives an easy and sensible solution of the phenomena of the heavenly motions; but forbade the mobility of the earth to be maintained as a thesis, or real effective thing; because they conceived it contrary to scripture. See *COPERNICAN System*, and *COPERNICUS*.

MOCAMBO, in *Geography*, a river of Africa, which runs into the Indian sea; 15 miles S. of Mozambique.

MOCANERA, in *Botany*, Just. 318, the name by which the *Visnea Mocanera*, Linn. Suppl. 251, is known in the Canary Islands, and which Jussieu preferred as a generic appellation, because he was informed the person from whom the other was derived, was unworthy of botanical commemoration. We have indeed been assured of this by the late Mr.

Mr. Masson, the discoverer of the shrub, who was very indignant at the name of *Vifnea*. Mr. De Vifne, designed to be honoured by it, was a merchant at Lisbon, who had a choice garden, and took delight in the cultivation of rare and curious plants, in a country where that taste was then in its infancy. So that, though he might not be a scientific botanist, his claim is equal to that of abundance of persons, on whom a similar honour has been, rather too indiscriminately indeed, bestowed. See *VISNEA*, or rather, as Schreber more correctly has it, *VISMEA*.

MOCARA, in *Geography*, a village of Egypt, situated in a chain of mountains, extending across the desert more than 150 miles from E. to W., in the road from Cairo to Siwah, and deriving their name from that of the village; 90 miles W. of Cairo.

MOCARANGA, or *MOCANA*, which has been erroneously called *Mon matapa*, from the title of the monarch, an extensive country of Africa, situated at some distance from the Indian sea, between 15° and 20° S. lat., and 28° and 36° E. long. But within its whole extent other countries are included, almost as far southward as the Cape of Good Hope, and on the N.W. to the confines of Congo; but on the W. and N.W. it is bounded by Monoemugi. The climate is temperate, though the mountains called Lupata, or the spine of the world, forming a great chain from N. to S., are perpetually covered with snow; the air clear and salubrious, and the soil fertile and well watered, so that its pastures feed a great number of cattle, more valued by the inhabitants than their gold. The country affords plenty of rice, millet, and other grain, but no wheat; fruit trees in abundance, and sugar-canes, which grow without culture; its forests swarm with wild beasts and variety of game; and its rivers abound with fish, and also with gold; nevertheless it is but thinly inhabited. Whilst those lands which are watered by the rivers Cuamo or Zambezi, which encircle the kingdom on the N. and W., and Spiritu Sancto, and others that flow into them, are fertile and productive, the inland parts are sandy, dry, and barren; and the occupiers, who are few in number, are under a necessity of fetching from a great distance water for washing their gold-dust, if their cisterns, for want of rain, fail to supply them. This country, though destitute of horses, and other beasts of burden, is overstocked with elephants, many of which are annually destroyed, so that the Portuguese are plentifully supplied with ivory. The riches of this part of Africa are of a large size, and supply grease and oil, which, as the inhabitants conceive, is a sovereign remedy against pains and aches as well as sprains and rigidity of the limbs, when taken inwardly, or applied externally. The natives are black, with woolly hair, they are well formed, robust, and healthy, and more agile and active than those of Quiloa, Mombasa, and Melinda. They are fond of war, which they prefer to traffic; and those of the lower class are habituated to diving; and by this practice, they fetch up from the bottoms of their rivers and lakes the mud that yields gold; and having separated the one from the other, they exchange their gold with the Portuguese for cotton cloths, and other articles of merchandize, which are brought hither from India and Europe. Their food consists of the flesh of oxen and elephants, salted and dried fish, and a variety of fruits; and also of bread made in their cities of rice or millet; and their drink is sour milk and oil of Sesame or Turkey wheat. Persons of superior rank and opulence have strong liquors made of honey, millet, and rice, and also palm-wine, which is held in high estimation. Their dress extends only from the girdle downwards; that of the common people is made of dyed cotton; but persons of quality wear Indian silks, or cotton embroidered with gold, over

which they commonly have a lion's skin, or that of some other wild beast, with the tail hanging behind, and trailing on the ground. The men marry as many wives as they can maintain; but the first is the chief, and her children are the father's heirs, the rest being treated as servants. The king, or emperor, is said to have 1000 wives, all of whom are the daughters of some of his vassal princes; but the title and honour of queen belong exclusively to the first. He neither wears in his own dress nor suffers his subjects to wear any clothes that are manufactured out of his own dominions, under an apprehension that they conceal some charm or poison. The metropolis of this empire is called "Benematapa," or "Banamatapa," and by some writers it is called "Medrogan." It is a spacious city, about 20 miles W. of Sofala. The houses are neat, white-washed within and without, and adorned with beautiful cloths of cotton, finely wrought or dyed. But the greatest ornament of the city is the imperial palace, which is a large and spacious edifice of wood, well flanked with towers, with four avenues, or stately gates, at which a numerous guard is constantly stationed. The emperor's guard is said to consist of women lightly armed. The Portuguese have two fortresses, and another station near the mountains of Fura, which are said to abound in gold. One of the emperor's queens is said to be the protectress of the Portuguese, and another of the Moors. The emperor, by the account of a Dutch commodore who visited this country in 1606, ruled from Mozambique to the Cape of Good Hope. The chief province is in an isle or delta, between two branches of the Cuamo and the Espirito. This isle is about 750 French leagues in circuit, and the chief town was Banamataxa. At that period there were many subject kings, and the emperor had a guard of 200 deys. Among the rivers that roll gold are the Panami, Luanga, and Mangiano. But later accounts of this country, and of other Portuguese settlements on the eastern coast of Africa, are wanting; the Portuguese, probably from motives of interest, are silent.

MOCAUMPOUR, capital of a country of the same name to the N. of the country of Bengal; 40 miles S.S.E. of Catmandu. N. lat. 27° 35'. E. long. 85° 37'.

MOCEFU, a town of Peru, in the diocese of Truxillo; 10 miles S.E. of Lambayeque.

MOCENIGO, ANDREW, in *Biography*, a noble Venetian, flourished in the early part of the sixteenth century, and was employed in the public service of his country, which he managed with success. As an author he wrote in Latin a "History of the War sustained by the Republic of Venice, in consequence of the League of Cambray, from 1500 to 1501, in four Books;" and he composed a poem in Latin verse on the war with Bazajet II., which is lost. Moreri.

MOCHA, a small island in the Pacific ocean, near the coast of Chili. S. lat. 38° 30'.

MOCHA, or *Mokha*, a town of Arabia, in the province of Yemen, situated on a dry and barren spot in that part of the province called Tehama, or the plain country. Its fortifications are the walls which surround it, some towers on the way to Mufa, dignified with the name of castles, and two other castles of the same fort, upon the two arms of the harbour. The greatest of these two castles is called "Kalla Tejar," and the smallest "Kalla Abdurrab," from the names of two saints buried in these places. These are provided with some few pieces of cannon. The houses in the city are built of stone: some of them are handsome; but others, both within and without the walls, are not better than the common huts that are found through all the Tehama.

Tehama. In the environs of this city are abundance of date trees and many agreeable gardens. Mocha was built about four centuries ago, and like many other cities of the Tehama, it owes its origin to a saint, the celebrated scheik Schædeli. This saint was in such reputation, that a multitude of persons from the most distant countries resorted hither to receive his instructions. His hermitage stood on the sea-side, and many huts were built around it for the accommodation of his followers: these formed a village, which by degrees was enlarged into a city. Some other circumstances contributed to give celebrity to its establishment. A ship bound from India to Jidda cast anchor, about 400 years ago, in this latitude. Several of the crew, perceiving huts in the desert, had the curiosity to visit them. The strangers were hospitably received by the scheik, and regaled with coffee, to which he ascribed singular virtues. The Indians, who were unacquainted with the use of coffee, thought that it might be a seasonable remedy to the master of the ship, who was ill. Schædeli assured them, that he should not only be cured by the efficacy of his prayers and of the coffee, but that if they would land their cargo there, they might dispose of it to considerable advantage. Assuming at the same time the air and the tone of a prophet, he told them that a city should one day be built upon that spot, which would become an eminent mart of the Indian trade. The master of the vessel visited the prophet, drank the coffee, and was restored to health. Many Arabs flocked to hear the preaching of the saint, and among them were several merchants, who purchased the whole cargo. The Indians returned home, related their adventure, and induced many of their countrymen to resort to this place. An elegant mosque was raised upon the tomb of the prophet, which stands without the walls of the city. The well that supplies the inhabitants with water, and one of the city gates, bear his name. His descendants are held in honour, and enjoy the title of scheik; the people swear by him; and his name will be remembered as long as Mocha stands. He is not only the patron of Mocha; but all the Mussulmans who drink coffee mention him every morning in their prayers, esteeming him as *their* patron; thanking God that through his mediation mankind were taught the use of coffee, and imploring the favour of heaven on the scheiks, his descendants. Mocha was the last city in Yemen of which the Turks retained possession. It is said that the Arabs did not conquer but buy it. Since the Turks were dispossessed, it has never had another master but the Imam. A Dola, having enriched himself in the government of this city, fortified it, and drew a ditch round it, which is now filled up. He was suspected of aspiring to independence, and was cast into prison. From that time, a Dola has never been continued above three years in this lucrative post. After the monsoon season, the Dola of Mocha is annually obliged to give an account of his administration, and is either confirmed in his employment, or instantly recalled to Sana. Many Jews live here in a separate village, as in the other cities of Yemen. Here are also about 700 Banians, Rajaputs, and other Indians, some of whom are merchants, and others gain a subsistence by the exercise of different mechanic arts. When they have made a small fortune, they return home to India; and on this account are always regarded as strangers. Several nations frequently traded to this port. The Portuguese, who two centuries ago were very powerful on the Arabic gulf, have long since ceased to send ships thither. The Dutch rarely appear here; and the French never in time of war, though they still continue to rent warehouses. The English at present engross, by way of India, almost exclusively, the whole trade of this place, which is conducted for them by a Banian. The trade of Mocha being so considerable, the cus-

oms must afford a large revenue to the Imam. The Turks, Arabs, and Indians, pay eight or ten *per cent.* upon their value; after they have been inspected at the custom-house: all Europeans enjoy the privilege of having their goods inspected in their own warehouses, and of paying only three *per cent.* upon their value. The Indians of late, since the English have become so powerful in Bengal, pay only three *per cent.* but the merchants in Mocha pay likewise five *per cent.* on all Indian goods which they purchase. There is also a tonnage duty, regulated not by the tonnage of the vessel but by the number of its masts. A merchant, however, who lades a large European ship with coffee in this port, receives from the Dola a premium of 400 crowns. The Arabs have scarcely any article for exportation except coffee, and of this the Indians are not very fond. The English ships must return empty to India, if they did not gain considerably by carrying money, with which the Arabian merchants entrust them. When a foreign vessel arrives in the road of Mocha, it must not salute with guns, but only hoist a flag. It is observable, that the trade on the coasts of the Red sea cannot be advantageous to any nation which have not settlements in India. The Arabians make no use of the productions of Europe. There is, indeed, a quantity of iron sold in Arabia, which has in times past been purchased chiefly from the Danes. A stranger cannot be too much on his guard against Mahometan brokers. He will find it advantageous to address himself rather to the Banians, among whom are many considerable merchants, who are very honest men. N. lat. 13° 19'. E. long. 43° 23'.

Mr. Bruce, in his "Travels to discover the Source of the Nile," mentions two other Mochas, besides that which we have above described. The first is in Arabia Deserta, in N. lat. 30 nearly, not far from the bottom of the gulf of Suez. The second is in S. lat. 3°, near Terfish on the coast of Melinda. The meaning of Mocha, he says, is in the Ethiopic *prison*, and it is particularly given to those three places, because in any of them a ship is forced to stay or be detained for months, until the change of the monsoon sets her at liberty to pursue her voyage.

MOCHICAGUI, a town of New-Mexico, in the province of Cinaloa; 60 miles W.N.W. of Cinaloa.

MOCHLIA, from *μοχλος*, a lever, in Surgery, a reduction of bones from an unnatural to a natural position.

MOCHO, or MOCOA Stones. See AGATE and DENDRITIS.

MOCHOW, in Geography, a town of Bohemia, in the circle of Kaurzim; 12 miles W.N.W. of Kaurzim.

MOCK-BIRD, Indian, in Ornithology. See TURDUS *Cyanus*.

Mock-Bird of Guiana. See ORIOLUS *Americanus*.

Mock Lead, in Mineralogy, a name given by the English writers to a sort of fossil, called also *blende* and *galena*.

Mock Nightingale, in Ornithology. See MOTACILLA *Atricapilla*.

Mock Orange, in Botany. See PHILADELPHUS.

Mock Privet. See MOCK PRIVET.

Mock, or running a muck, is a practice that has prevailed time immemorial in Batavia. To run a muck, in the original sense of the word, is to get intoxicated with opium, and then rush into the street, with a drawn weapon, and kill any one that comes in the way, till the party is himself either killed or taken prisoner. If the officer takes one of these *omocks* or *mobaroks* (as they have been called by an easy corruption) alive, he has a considerable reward, and the unhappy wretches are always broken alive on the wheel: but such is the fury of their desperation, that three out of four

are necessarily destroyed, in attempting to secure them. See AMOK.

MOCKELN, in *Geography*, a lake of Sweden, in the province of Smaland; 25 miles S.W. of Wexio.

MOCKERN, a town of the duchy of Magdeburg; 16 miles E. of Magdeburg.

MOCKJACK BAY, a bay of America, on the coast of Virginia, in the Chesapeake. N. lat. 37° 24'. W. long. 76° 23'.

MOCLIN, a town of Spain, in the province of Granada; 12 miles S. of Loja.

MOCO, in *Commerce*, a small silver coin in the West Indies, which in some places is $\frac{1}{4}$ th of the dollar, and in others $\frac{1}{8}$ th.

MOCOA, in *Geography*, a town of South America, in the province of Popayan; 70 miles S.E. of Popayan.—Also, a town of Mexico, in the province of Culiacan, on the river St. Sebastian; 90 miles N.W. of Culiacan.

MOCOCO, or MAUCACO, in *Zoology*. See LEMUR *Catto*.

MOCODAME, in *Geography*, a small island near the S.E. coast of Nova Scotia. N. lat. 45° 4'. W. long. 61° 20'.—Also, a river of Sumatra.

MOCOS, a tribe of the Eboe slaves, brought from the interior of Africa. See EBOES.

MOCO-MOCO, a town of Sumatra, the capital of Anac-Soongey, on the S.W. coast. This country rose from the ruins of Indrapour, and extends on the sea-coast from Mandoota river to that of Ori. A small tax was laid on the people of Anac-Soongey, in satisfaction for the murder of a prince by the raja of Indrapour, which is now paid to the sultan of Moco-Moco. The tax is a foocoo (the 4th part of a dollar), a bamboo of rice, and a fowl, from each village annually. The government of Anac-Soongey is Malay, but a great part of the country dependent upon it is inhabited by the original doosoon or village people. The chiefs are obliged to attend the sultan, and carry their contribution or tax; but his authority is very much limited. The officers next in rank to the sultan are called Mantrié, a corruption, as some have supposed, of Mandarin; 30 miles S.W. of Indrapour. S. lat. 2° 25'. E. long. 101° 12'. Marsden's Sumatra.

Moco-Moco, or *Little Oroonoko*, a river of South America, which runs into the Atlantic, a little S. of Oroonoko.

MOCORITO, a town of Mexico, in the province of Culiacan; 72 miles N.W. of Culiacan.

MOCOS, a collection of small islands in the Indian sea, near the coast of Siam. N. lat. 13° 50'. E. long. 97° 52'.

MODAGHIRY, a town of Hindoostan, in Mysore; 13 miles N. of Venicatighery.

MODAIN, MADAIN, or *el Modain*, a town of the Arabian Irak, on the side of the Tigris, on the site of the ancient Ctesiphon. It is said by Herbelot to have been founded by Sapor and enlarged by Chosroes, who built a palace here that was the most magnificent in all the East. In 637 this place was taken and plundered by Said, the lieutenant of Omar. The riches of which it was despoiled were immense, consisting, in part, of the throne, the crown, the royal standard, and carpet of the ancient Persian kings; 20 miles S. of Bagdad.

MODAL, in *Logic*, &c. a term applied to propositions which include certain conditions and restrictions.

MODAL, in *Music*. The characters for time in the first stages of figurative music or counter-point were called *modal signs* for the moods.

The different modes or moods for ascertaining the *quan-*

tum of each tact, or pulsation of time in music, were the following:

○ ○ 3, for a perfect long, or three breves.

○, a perfect breve, or three semibreves.

○, two imperfect breves, and, in the compositions of Tallis and Bird, sometimes three minims.

○, an imperfect breve, or two semibreves.

Besides these, there were others for a species of jig time, in which semibreves or minims were ternary, and moving in triplets, while the longer notes were binary: C 3, C 2, C 3, &c. Zaccani, *Prat. Mus. lib. ii. cap. 54.* makes the modal signs amount to fourteen.

MODANE, in *Geography*, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of St. Jean de Maurienne; 15 miles E. of it. The place contains 925, and the canton 3267 inhabitants, on a territory of 450 kilometres, in 7 communes.

MODBURY, a market-town and borough, situated in the hundred of Ermington, and county of Devon, England. The town consists chiefly of four streets, running in the direction of the cardinal points, and crossing each other at right angles. It is a borough by prescription, but has lost its right of sending members to parliament, having petitioned to be exempted from that *burthen*, as it was then considered, in the reign of Edward I. The plea of exemption was the poverty of the inhabitants, who were unable to pay their representatives, as was customary at that early period. Modbury is now governed by a portreeve (usually styled mayor), two constables, and several other officers, who are elected annually at a court-leet held at Michaelmas. All persons who possess any freehold within the borough are liable to be chosen; being considered in the light of freemen or free burgesses. Even so late as the commencement of the last century, it appears from the records, that the borough-court here took cognizance of all debts under forty shillings; and in the reign of Charles I. the same records shew that the inhabitants possessed the authority of enrolling deeds in the rolls of the borough. The chief support of this town is its woollen trade, which was formerly much more considerable than at present. A great quantity of yarn was likewise spun here and in the neighbourhood about fifty years ago, at which time a weekly market was held, distinctly to facilitate the sale of that article. This market has long been discontinued, but to preserve the right, the bell still rings for the yarn-market at twelve o'clock. A plush and hat manufactory have also been established of late years. The petty sessions for the hundred are held here. Thursday is the market-day for provisions.

The population of this town, according to the parliamentary returns of 1801, comprised 1813 persons, 832 males, and 981 females, of which number 862 were returned as engaged in trade, and 944 in agriculture.

The church of Modbury is a very spacious and handsome building, surmounted by a lofty spire, of later erection than the rest of the edifice. On the south aisle stands a fine alabaster statue, in armour, supposed to be the effigy of one of the Champernoune family. Besides the established church, there are two other buildings in this town appropriated to divine worship; one belonging to the Presbyterians, and the other to the Anabaptists. Here was formerly an alien priory, dependent on the abbey of St. Peter sur Dive, in Normandy, which seems to have been founded shortly after the conquest. Its religious inmates were monks of the order of St. Benedict. On the dissolution of the alien monasteries, in the reign of Henry VI., this priory was granted to the college at Eaton. The precise site on which it stood is uncertain, but as there are two fields adjoining to the western side

of the church-yard, still called "Priors'-parks," it was most probably situated somewhere near that spot. Indeed, on the opposite side of the road which passes these parks, there appear some remains of an ancient building, which may have formed part of the priory.

The proprietor of the manor here, at a very remote period, was sir James Okestone, or Oxton, from whose family it passed into that of the Champernoues, who possessed a splendid mansion immediately adjoining to the town, only a small portion of which is now standing. Of the grandeur of this seat, and the magnificent manner in which its owner lived, tradition speaks very highly. They are said, in particular, to have kept a fine band of singers and musicians, with whose execution queen Elizabeth was so much delighted, that she requested the loan of them for a month, but being refused by Mr. Champernoune, out of pique found some pretence to sue him at law, and occasion his ruin; he being compelled to sell no less than nineteen manors to support the litigation.

The vicinity of this town is adorned with a number of family seats, some of ancient and others of modern erection. Wimpston, the ancient mansion of the Fortescues, is particularly remarkable as being the house in which the celebrated sir John Fortescue was born. This gentleman raised himself by his talents to the dignity of chief justice and chancellor in the reign of king Henry VI., and wrote a work entitled "De Laudibus Legum Angliæ," which is still held in great repute among legal antiquaries. The other seats of note near Modbury, are Train, Fleet-house, Madridge, Fowlescombe, Stowford, Butterford, Shilston, and Fardel, which last was long in possession of the Raleighs. Polwhele's History, &c. of Devonshire, two vols. folio. Beauties of England and Wales, vol. iv.

MODDAPOUR, a town of Bengal, on the right bank of the Ganges; 27 miles N. of Mahmudpour.

MODDIGONG, a town of Hindoostan, in Goondwana; 10 miles N. of Ramteak.

MODDIGUBA, a town of Hindoostan, in the circar of Gooty; 10 miles W. of Amantpour.

MODE, or MOOD, *Modus*, in *Philosophy*, a manner of being; or a quality or attribute of a substance, or subject, which we conceive as necessarily depending on the subject, and incapable of subsisting without it.

Mr. Locke defines modes to be those ideas (he should have said *things*) which do not imply any supposition of subsisting by themselves, but are considered as mere dependencies, and affections of substances.

Our ideas of things may be reduced to two kinds: the one of things, which we conceive separately, and by themselves, called *substances*; and the other of things which we conceive as existing in others, in such manner as that we cannot allow them existing without them, and these we call *modes* or *accidents*.

It is the characteristic, then, of a true mode, to have such a relation to some subject, as not to be clearly and distinctly conceivable without conceiving the subject, of which it is a mode, at the same time: when, on the other hand, the conception of the subject does not at all infer or require that of the mode.

Thus, what gives us to know that thought is not a mode of extended substance, or matter, is, that extension, and the other properties of matter, may be separated from thought, without ceasing to conceive thought all the while.

We always consider things as clothed with certain modes, except we reflect on them in the abstract, or general; and it is the variety of modes, and the relations, that occasions the great variety of denominations of the same thing.

They are the various modes of matter, *e. g.* that make all the diversity of bodies, or corporeal beings, in nature.

There are various divisions and kinds of modes: as, 1. *essential*, or *accidental*. An *essential* mode, or *attribute*, is that which belongs to the very nature or essence of the subject in which it is; and the subject can never have the same nature without it, as roundness in a bowl, solidity in matter, thinking in a spirit, &c. and this is *primary*, when it is the first or chief thing that constitutes any being in its particular essence or nature, and makes it to be that which it is, and distinguishes it from all other beings, as roundness in a bowl: or *secondary*, which is any other attribute of a thing, that is not of primary consideration, called a *property*; as volubility in a bowl. An *accidental* mode, or *accident*, is such a mode as is not necessary to the being of a thing; for the subject may be without it, and yet remain of the same nature which it had before; or it is that mode, which may be separated from its subject, as blackness or whiteness in a bowl, learning in a man, &c.

2. Modes are *absolute* and *relative*. An *absolute* mode is that which belongs to its subject; without respect to any other beings whatsoever. A *relative* mode is derived from the regard which one being has to others: thus, roundness and smoothness are the *absolute* modes of a bowl; but greatness and smallness are *relative*. See RELATION.

3. Modes are *intrinsic*, or *extrinsic*. The former are conceived to be in the subject or substance; as when we say a globe is round, &c. The latter mode is a manner of being which some substances attain by reason of something that is external or foreign to the subject, and is called external denomination; as the globe lies within two yards of the wall, &c.

4. Modes are also *inherent*, or *adherent*, *i. e.* *proper* or *improper*. *Adherent* modes arise from the joining of some accidental substance to the chief subject, which yet may be separated from it; as when a bowl is wet, &c. *Inherent* modes have a sort of in-being in the substance itself; as the bowl is swift or round, &c.

5. *Action* and *passion*, using the terms in a philosophical sense, are modes which belong to substances; as when a smith with a hammer strikes a piece of iron, the smith and hammer are agents or subjects of action, and the iron is the patient, or subject of passion.

6. Modes may be divided into *natural*, *civil*, *moral*, and *supernatural*, all which pertain to the apostle Paul, who was a little man, a Roman by the privilege of his birth, a man of virtue or honesty, and an inspired apostle.

7. Modes belong either to *body*, or to *spirit*, or to both. Modes of *body* belong only to matter, or corporeal beings; such are *figure*, *rest*, *motion*, &c. These are *primary*, when they belong to bodies considered in themselves, whether there were any man to take notice of them or no, as shape, size, &c.; or *secondary*, which are such ideas as we ascribe to bodies, on account of the various impressions that are made on the senses of men by them, called secondary qualities: such are all colours, sounds, tastes, smells, and all tactile qualities. (See QUALITY.) Modes of *spirit* belong only to minds, such are *knowledge*, *will*, &c. Modes belonging to body and spirit, are called mixt or human modes, because they are found in human nature; such are *sensation*, *imagination*, *passion*, &c. in which there is a concurrence of the operation of animal and intellectual nature.

8. There are also modes of other modes, which, though they subsist in and by the substance, as the original subject of them, are properly and directly attributed to some mode of that substance; thus swiftness and slowness are modes of motion, which is itself the mode of a body.—Watt's Logic, p. i. c. 2. § 3 and 4.

Mr. Locke divides modes into *simple*, and *mixt* or *compound*.

Modes, *Simple*, are combinations of simple ideas of the same kind, or even of the same simple ideas divers times repeated; as a dozen, a score, &c. which are only the ideas of many distinct units put together.

The modifications of any simple idea, Mr. Locke observes, are as perfectly different and distinct ideas in the mind, as those the most remote and inconsistent: thus, *two* is as distinct from *three* as blindness is from heat. With this view that author examines the *simple* modes of space; which are found to be distance, capacity, extension, figure, place, and duration.

The mind has several distinct ideas of *sliding*, *rolling*, *crawling*, *creeping*, &c. which are all but the different modifications of motion. *Swift* and *slow* are two different ideas of motion, the measures of which are made out of the distance of time and space put together.

The like variety we have in sounds; every articulate word is a different modification of sound, as are all notes of different length put together, which makes that complex idea called *time*.

The modes of colours might be also very various; some of which we take notice of as the different degrees, or as they are termed, *shades of the same colour*. But since we seldom make assemblages of colours without taking in figure also, as in painting, &c. those which are taken notice of, do most commonly belong to mixed modes; as, *beauty*, *rain-bow*, &c. All compounded tastes and smells are also modes made up of the simple ideas of those senses.

As to the modes of *thinking*; when the mind turns its view inward upon itself, *thinking* is the first idea that occurs, in which it observes a great variety of modifications; and therefore frames to itself distinct ideas.

Thus the perception annexed to any impression on the body made by an external object, is called *sensation*. Where an idea recurs without the presence of the object, it is called *remembrance*. When sought after by the mind, and brought again in view, it is called *recollection*. When held there long under attentive consideration, it is called *contemplation*. When ideas float in the mind without regard or reflection, it is called in French a *reverie*. When the ideas are taken notice of, and, as it were, registered in the memory, it is *attention*. When the mind fixes its view on any one idea, and considers it on all sides, it is *intention* and *study*.

Of these various modes of thinking, the mind forms as distinct ideas, as it does of white and red, or of a square or a circle.

Modes, *Mixt*, are combinations of simple ideas of several kinds; as in *beauty*, which consists in a certain composition of colour, figure, &c.; *theft*, which is the concealed change of possession of any thing, without consent of the proprietor, &c.

There are three ways by which we get ideas of *mixt* modes:
 1. By experience and observation of things themselves; thus, by seeing two men wrestle, we get the idea of wrestling.
 2. By invention, or voluntary putting together of several simple ideas of our own minds: so he that first invented printing, had an idea of it first in his mind before it ever existed.
 3. By explaining the names of actions we never saw, or notions we cannot see; and by enumerating all those ideas, which go to the making them up: thus, the *mixt* mode which the word *lye* stands for is made up of the simple ideas.
 1. Articulate sounds. 2. Certain ideas in the mind of the speaker. 3. Words, the signs of these ideas. And,
 4. Those signs put together by affirmation, or negation,

otherwise than the ideas they stand for are in the mind of the speaker.

Mixt modes have their unity from an act of the mind, combining those several simple ideas together, and considering them as one complex one: the mark of this union is one name given to that combination.

This gives the reason, why there are words in every language, which cannot be rendered by any one single word of another. For the fashions and customs of one nation make several combinations of ideas familiar to one, which another had never any occasion to make. Such were *οργανισμοι* among the Greeks, and *proscriptio* among the Romans.

This also occasions the constant change of languages; because the change of custom and opinion brings with it new combinations of ideas, which, to avoid long descriptions, have new names annexed to them, and so they become new species of *mixed* modes.

Of all our simple ideas, those which have had most *mixed* modes made out of them, are thinking, and motion (which comprehend in them all action), and power, from whence these actions are conceived to flow.

Of this kind are the modes of actions, distinguished by their causes, means, objects, ends, instruments, time, place, and other circumstances; as also of the powers fitted for those actions. Thus *boldness* is the power to do or speak what we intend, without fear or disorder; and this power of doing any thing when it had been acquired by frequent doing the same thing, is that idea we call *habit*; and when forward and ready, upon every occasion, to break into action, we call it *disposition*: thus *testiness* is a disposition or aptness to be angry. Power being the source of all action, the substances, in which those powers are, when they exert this power, are called *causes*: and the substances thereupon produced, or the simple ideas introduced into any subject, are called *effects*. The efficacy by which the new substance or idea is produced, is called in the subject exerting that power, *action*; and, in the subject in which any simple idea is changed, or produced, *passion*: which efficacy, in intellectual agents, we can conceive to be nothing else but modes of thinking and willing; in corporeal agents nothing else but modifications of motion.

MODE, *Division of a*. See DIVISION.

MODE, in *Grammar*. See MOOD.

MODE, in *Logic*. See MOOD.

MODE is also used for the modification of a proposition; or that which renders it *modal* and *conditional*.

MODE, *Indirect*. See INDIRECT.

MODE, Fr. a key in *Musick*. In plain-chant the modes are numbered.

The ecclesiastical modes are called *authentic*, when the 5th is above the principal, as $\overset{a}{E}$; and *plagal*, when the 4th

is above the principal, and the 5th below its octave, as $\overset{d}{G}$.

See CANTO-FERMO, and TONES of the CHURCH.

MODES of the *Ancient Greek Music*. The ancients differ extremely among themselves in defining their modes; obscure in all parts of their music, upon this subject they are nearly unintelligible. They all agree that a mode is a certain system or constitution of sounds, and it seems as if this constitution was in itself nothing more than an octave filled with all the intermediate sounds according to the genus.

In high antiquity, the Greeks had but three modes, at the distance of a tone from each other, which was natural:

the lowest being called the *Dorian*, the middle the *Phrygian*, and the highest the *Lydian*.

Afterwards, in dividing the tones into semitones, two other modes were obtained, as the *Ionian* and the *Æolian*; the first being inserted between the *Dorian* and the *Phrygian*, the second between the *Phrygian* and the *Lydian*.

In process of time the system being extended above and below, musicians established new modes at both extremities, which took their denomination from the first five, adding the prepositions *hyper*, above, and *hypo*, below. Thus the *Lydian* mode was followed by the *hyper-Dorian*, the *hyper-Ionian*, the *hyper-Phrygian*, the *hyper-Æolian*, and the *hyper-Lydian*, ascending; and after the *Dorian* mode, came the *hypo-Lydian*, the *hypo-Æolian*, the *hypo-Phrygian*, the *hypo-Ionian*, and the *hypo-Dorian*, in ascending. These fifteen modes are all enumerated in *Alypius*. See the plate, where their order and intervals are expressed in Greek characters, and by equivalent notes in the *Guido* scale. But it must be remembered, says *Rouffeu*, that the *hypo-Dorian* was the only mode which was used to its whole extent. In proportion as the others mounted, the upper notes were avoided, in order not to exceed the natural compass of the voice. These observations are necessary for the clearing up some passages in ancient authors, which seem to imply that the lowest modes had the highest notes, which indeed was true, in having in their melodies more notes above the keynote. For want of this knowledge, *Doni* is extremely embarrassed by these apparent contradictions.

Greek theorists differ in the number of modes: while with some they amount to 15, *Aristoxenus*, according to *Euclid*, admitted only 13, suppressing the two highest; the *hyper-Æolian*, and *hyper-Lydian*. But in the work of *Aristoxenus* that is come down to us, he only specifies six, concerning which he relates the different sentiments of the times.

At length, *Ptolemy* reduced the number of these modes to seven; saying that modes were introduced in music in order to vary the melodies by the contrast of grave and acute; for it is evident that they may be multiplied far beyond 15; but these seven suffice to facilitate the transition from one mode to another, by consonant intervals easy to produce.

He therefore includes all the modes in the compass of an octave, of which the *Dorian* mode was the centre; so that the *mixo-Lydian* was a 4th above, and the *hypo-Dorian* a 4th below. The *Phrygian* a 5th above the *hypo-Dorian*; the *hypo-Phrygian*, a 4th below the *Phrygian*: whence it appears, that to count from the *hypo-Dorian*, which is the lowest mode, there was the distance of a tone to the *hypo-Phrygian*; from the *hypo-Phrygian* to the *hypo-Lydian*, another tone; from the *hypo-Lydian* to the *Dorian*, a semitone; from that to the *Phrygian*, a tone; from the *Phrygian* to the *Lydian* still a tone, and from the *Lydian* to the *mixo-Lydian*, a semitone, which extend to a seventh, in the following order:

1	-	F	-	-	Mixo-Lydian.
2	-	E	-	-	Lydian.
3	-	D	-	-	Phrygian.
4	-	C	-	-	Dorian.
5	-	B	-	-	Hypo-Lydian.
6	-	A	-	-	Hypo-Phrygian.
7	-	G	-	-	Hypo-Dorian.

Ptolemy retrenched all the other modes, pretending that these seven occupied all the sounds of the diatonic octave. From these seven modes of *Ptolemy*, with the addition of the *hypo-mixo-Lydian*, it is supposed that *Guido* formed the eight ecclesiastical modes. See *TONES of the CHURCH*.

Such is the clearest notion which we are able to form of the tones or modes of the ancient music; while we consider them as differing from each other only by grave and acute; but still other differences subsisted, which characterized them more particularly: as expression, the kind of poetry to which they were applied, the kind of instrument by which they were accompanied, the rhythm or cadence of the verse, names or *ars* peculiar to certain people from whom the principal modes had their names: as the *Dorian*, *Phrygian*, *Lydian*, *Ionian*, *Æolian*.

There were still other modes, which should rather be called styles or kinds of composition: as the tragic mode, appropriated to the theatre; the nomic, consecrated to *Apollo*, the dithyrambic, to *Bacchus*, &c. See *STYLE* and *MELOPŒIA*.

In our old music, the word *mode*, or *mood*, was applied to measure or time, in order to fix the relative value of all the notes in a movement by a general sign, which was placed after the clef, at first by circles and semi-circles pointed, or without points, according to the numbers 2 and 3, differently combined. It is from these ancient expedients that

we still retain $\overline{\text{C}}$ for common time, and a barred $\overline{\text{C}}$ for a

quicker dual measure. See *MODAL* and *PROLATION*.

These characters, except the two last mentioned, have long been disused; yet it is necessary to understand them, in order to be able to decipher old music.

Thus far the chief of this article is from *Rouffeu*, which includes almost all the knowledge on the subject, that the most laborious and profound commentators of the seven ancient *Greek* writers on music, published by *Meibomius*, ever conjectured, we dare not say discovered, on the subject.

The general opinion concerning the modes of *Ptolemy*, till about the middle of the last century, was such as we have described, till *fr. Haskins Eyles Stiles* formed an ingenious hypothesis concerning them, which was read to the *Royal Society* in 1759, and afterwards published in the *Philosophical Transactions*, vol. li. part ii. for 1760, under this title: "An Explanation of the Modes or Tones in the Ancient Grecian Music." *Sir Francis* in this dissertation endeavours to prove, that the ancients had a double doctrine of the modes, an *harmonic* and a *musical* doctrine. By the *harmonic* doctrine, the modes were all one and the same series of intervals, such as the general system furnishes, only at different pitches; by the *musical*, they consisted of so many different arrangements of intervals, or species of octave. *Sir Francis* regarded the *harmonic* doctrine as only a tuning trick, to produce more readily the different species of octave between the fixed sounds.

He explains this in a diagram, taking his pitch, according to *Ptolemy*, at *hypate meson*, our *E* in the base, and makes all his mutations between that sound and its octave, *nete die zeugmenon*. And this, according to *fr. F. E. Stiles*, is the *diapason* chosen by *Ptolemy*, cap. 2, lib. ii. for the purpose of exhibiting his divisions of the several species.

Diagram of the Species of Diapason in the seven Modes admitted by *Ptolemy*, according to the Doctrine of *Sir Francis Haskins Eyles Stiles*.

Mese

Mixolydian. Key of D minor. Lydian.

Mese C*

Lydian.

Mese B

Phrygian.

Mese A

Dorian.

Mese G*

Hypolydian.

Mese F*

Hypophrygian.

Mese E

Hypodorian.

Sir Francis gives quotations from the ancient Greek writers in confirmation of his doctrine, several of which indeed seem favourable to it; at least they imply a difference on some occasions from the intervals in the natural or great system: this difference he imagines to be expressed by the term *μεταβολη*, *mutatio*.

He very truly asserts, that no transposition of the same melody into a higher or lower key, can have so powerful an effect as a change in the modulation, or succession of intervals; and observes, that modern music has but two considerable changes in the same key; these are from major to minor, and from minor to major. The first seems reserved for pathetic effects.

Sir Fr. Haskins Eyles Stiles falls foul on all his predecessors. After his opinion, we have that of Rousseau, the chief part of whose article in his *Diét. de Mus.* we have translated, and given whatever is most new and useful in former and subsequent articles, and his opinion on the ancient Greek modes and other articles peculiar to the music of the ancients.

Metastasio, in two letters to Saverio Mattei on the Grecian music, has considered it with his usual elegance, candour, and clearness; but he does not treat of the modes in particular, so much as on ancient Greek music in general. We shall therefore reserve our extracts from these two letters, till Greek music and music of the ancients are considered at large. See SYSTEM.

MODECCA, in *Botany*, a genus of the Cucurbitaceous order, figured in Rheede Hort. Malab. v. 8. t. 20-23, and indicated by Jussieu under *Passiflora*, Juss. Gen. 398. A species of the same, from Sierra Leone, flowered many years ago, in lady Amelia Hume's stove, and still exists there. We believe it to be a perfectly well defined genus, and have proposed to call it *Blepharanthus*, on account of the fringed petals, which make its essential character, and to preserve an analogy with its near ally *Trichosanthes*. We have only waited for a more correct knowledge of the

several species, and of some circumstances in the generic character. It is abundantly distinct from *Passiflora*. S.

MODEL, an original, or pattern, proposed for any one to copy or imitate.

St. Paul's church is said to be built after the model of St. Peter's at Rome.

MODEL is particularly used in building for an artificial pattern, made of wood, stone, plaster, or other matter, with all its parts and proportions; in order for the better conducting and executing some great work, and to give an idea of the effect it will have in great.

In all great buildings it is much the surest way to make a model in relievó; and not to trull to a bare design, or draught. There are also models for the building of ships, &c. and for extraordinary stair-cases, &c.

MODEL, in *Painting and Sculpture*, is any thing proposed to be imitated. And

Hence, in the academics, they give the term model to a naked man, disposed in several postures, to give an opportunity to the scholars to design him in various views and attitudes.

The sculptors have little models of clay or wax to assist them in their designs of others that are larger, in marble, &c. and to judge of the attitude and correctness of a figure.

Statuaries likewise give the name model to certain figures of clay or wax, which are but just fashioned, to serve by way of guide for the making of larger, whether of marble or other matter.

MODENA, *Duchy of*, in *Geography*, a principality of Italy, bounded on the N. by the duchy of Mantua, on the E. by the Bolognese, on the S. by the republic of Lucca, and on the W. by the duchy of Parma, and part of Tuscany; about 60 miles in its greatest length, and from 20 to 36 in breadth. The soil resembles that of the duchy of Parma; the agriculture is little superior, the middle-men and metayers impeding industry, though some peasants in the mountains are proprietors of land. The breed of sheep is neglected. The country, however, abounds in corn, excellent wine, and other productions. In some parts is found a kind of alkaline earth, which, being reduced to powder, has been used as an antidote to poisons, fevers, dysenteries, and others disorders. In other parts wells are dug, 40 or 60 feet deep, and on the water a reddish petroleum is seen to float, which abounds most in autumn and spring. These wells are enclosed, and every fortnight oil is skimmed off the surface; and this oil is used for embalming, varnishing, painting, and as an ingredient in some medicinal preparations. Amber is dug out of a soil impregnated with petroleum. This duchy affords a variety of petrifications. In digging wells near Modena, to a certain depth, a particular stratum is found, on penetrating which the water gushes up as from a subterranean lake or river. About 10 miles S. of the capital there is an aperture in the earth called "La Salza," whence, particularly in spring and autumn, ascend, with a very loud noise, smoke, flame, ashes, and stones, attended with a strong smell of sulphur. Carrara, in the S. of this duchy, affords the celebrated marble used in statuary. The chief rivers are the Crostolo, the Secchia, and the Panaro. This duchy is a remnant of the power of the celebrated family of Este, who also possesses the adjacent country of Ferrara, which was seized by the pope in 1598. The remaining territory contains about 320,000 souls, and the city of Modena 30,000; the revenue being 140,000*l.* Since the French revolution, which has produced such changes in the geography, as well as in the general state of Europe, the whole of this duchy forms a part of Italy, and is now divided into

into the departments of the Crostolo, the Panaro, and the Apennines.

MODENA, the capital of the above duchy, and now capital of the department of Panaro, the ducal residence, and a bishop's see, is an ancient, large, tolerably built, fortified town, with a strong citadel, containing a ducal palace, which is large and splendid, and distinguished by a well furnished picture-gallery, a cathedral, many parish churches and convents, and from 25,000 to 30,000 inhabitants. It is situated in a fertile plain; and its streets are, in general, large, straight, and ornamented with porticoes and piazzas. The university was for a long time under the direction of eminent professors; and the magnificent college of Charles Boromeo, is an academy for 70 or 80 young noblemen. In a chamber under the cathedral tower is the curiosity so much talked of by travellers, called "Secchia rapita," which is nothing more than a well-bucket, with iron hoops, hung up by an iron chain, taken in a war from the inhabitants of Bologna, and preserved here as a trivial monument of courage and victory. The house of Este possessed this city ever since the year 1288. On the approach of the French, the duke retired from his dominions, with a large sum of money, to Venice. Upon an armistice, he agreed to pay to the republic 7,500,000 livres in cash, 2,500,000 livres in provisions and military stores, and to give, besides, pictures and other douceurs; 30 miles S. of Mantua. N. lat. 44° 38'. E. long. 10° 56'.

MODENORE, a town of Hindoostan, in the circar of Condapilly; 20 miles N.W. of Masulipatam.

MODÉRATA, MISERICORDIA, in *Law*, a writ that lies for him who is amerced in a court-baron or other court, not of record, for any transgression beyond the quality or quantity of the offence. It is directed to the lord of the court, or his bailiff, commanding them to take a *moderate amercement* of the party. This writ is founded upon Magna Charta.

If a man be amerced in a court-baron on presentment by the jury, where he did not any trespass, he shall not have this writ, unless the amercement be excessive and outrageous; and if the steward of the court, of his own head, will amerce any tenant or other person without cause, the party ought not to sue for this writ of moderata misericordia if he be distrained for that amercement; but he shall have action of trespass. (New Nat. Br. 167.) When the amercement which is set on a person is assessed by his peers, this writ of moderata misericordia doth not lie; for then it is according to the statute 10 Edw. II.

MODERATION, in *Ethics*, is a virtue consisting in the proper government of our appetites, passions, and pursuits, with respect to honours, riches, and pleasures; and in this sense it is synonymous with *temperance*: it is also often used to denote *candour*.

MODERATO, Ital. in *Music*, implies a time neither quick nor slow; much resembling *andante*, but somewhat quicker. See *ANDANTE*.

MODERATOR, in the *Schools*, the person who presides at a dispute, or in a public assembly.

Such a doctor was the moderator, that is, the president, at such a disputation, in such an assembly, &c.

MODERATOR Ring, in *Anatomy*, is used by Valsalva for that ring which the muscles of the eye make round the optic nerve, at the bottom of the orbit. He alleges, that the exterior fibres of these muscles which rise from the nerve, must shorten it when they contract, and when the interior fibres act they must compress it; so that these different fibres of the muscles affect the nervous fluid here very differently.

Valsalva also describes such another ring made round the motory nerves of the eye; but acknowledges, that it is neither so remarkable nor distinct as the former. Med. Eff. Edin. Abr. vol. ii. p. 410.

MODERE', Fr. in *Music*. See *MODERATO*.

MODERN, something new, or of our time. In opposition to what is antique, or *ancient*.

Modern authors, according to Naude, are all those who have written since Boethius: the modern philosophy commences with Galileo: and the modern astronomy with Copernicus.

MODERN Medals are reckoned all those that have been struck within these three hundred years. See *MEDAL*.

MODERN, in *Architecture*, is improperly applied to the present, or Italian manner of building; as being according to the rules of the antique. Nor is the term less abused when attributed to architecture purely Gothic.

Modern architecture, in propriety, is only applicable to that which partakes partly of the antique, retaining somewhat of its delicacy and solidity; and partly of the Gothic, whence it borrows members and ornaments, without proportion or judgment.

MODERN Music, *Musica Moderna*, may be divided into two parts: first, *antiquo moderna*, which is generally a serious sort of music, consisting of many parts; and which has been in use from Guido's time to the beginning of the last century. Secondly, the *modern*, which has been used in the two last centuries: it is very different from the *antiquo moderna*, being brisker, lighter, gayer, and more sprightly.

The characteristics of the first state of counterpoint, or music in parts, were *plain simple harmony*, consisting of common chords, of note against note; then *figurative harmony*, or notes of different lengths, consisting of different figures or characters moving at the same time. After this was found to be possible, the more artificial contrivances were cultivated of fugue and canon, but without air or melody, except in fragments of canto-fermo, and tunes of such popular ballads as were sung in the streets, and upon which most of the early masses in four parts were constructed.

MODERN, or *Modra*, in *Geography*, a town of Hungary; 14 miles N.N.E. of Presburg.

MODESTY, in *Ethics*, is sometimes used to denote humility; and sometimes to express chastity or purity of sentiment and manners. Modesty was deified by the Romans under the name of "Pudicitia;" and at Rome she had two temples, one dedicated to the chastity of the nobles, and the other to that of the populace, and also altars on which sacrifices were offered to her. The origin of the distinction between the chastity of the Patrician ladies, and that of the Plebeians, is thus related by Livy (l. x. c. 25.) Virginia, of a Patrician family, having married a Plebeian named Volumnius, who was, however, afterwards consul, her sister, looking upon this match to be unworthy her name, having joined with the other matrons, would no longer suffer her to partake in the mysteries of the goddesses of Chastity, but drove her out of the temple. Virginia, stung with this affront, got a chapel raised in the long street, the same where was the goddess's temple from which she was excluded, and she dedicated it to the chastity of the Plebeian ladies; where the wives, who were not of the senatorian order, convened from that time to offer sacrifice to that goddess. Chastity was represented under the figure of a woman veiled, or seeming to point her right-hand, or her fore-finger, to her face, to signify that she has no reason to blush.

MODI, in *Geography*, a small island in the gulf of Engia. N. lat. 37° 27'. E. long. 23° 33'.

MODIA.

MODIANORE, a town of Hindoostan, in Myfore; 45 miles E.N.E. of Bangalore.

MODIBOO, a town of Africa, in the kingdom of Bambarra, delightfully situated on the banks of the Joliba or Niger, which is here very broad, and cultivated with many small and verdant islands, all of them stocked with cattle, and crowded with villages; 65 miles N.E. of Segou. N. lat. $14^{\circ} 38'$. W. long. $1^{\circ} 35'$.

MODICA, a town of Sicily, in the valley of Noto; 8 miles W. of Noto. N. lat. $36^{\circ} 51'$. E. long. $14^{\circ} 43'$.

MODIFICATION, in *Philosophy*, that which modifies a thing; that is, gives it this or that manner of being.

Quantity and quality are accidents which modify all bodies.

According to Spinoza's system, all the beings that compose the universe are only so many different modifications of one and the same substance. And the different arrangement and situation of their parts make all the difference between them.

MODIFICATIVE, something that modifies, or gives a thing a certain manner of being.

Father Buffier establishes a new part of speech, which he calls *modificative*. Nouns and verbs, he observes, are susceptible of divers circumstances or modifications; in the phrase, *zealists*, we have a noun and verb without any modification; but in that, *zeal without discretion acts rashly*, the noun and verb are each attended with a modification or circumstance.

The last kind of words, which serve to modify nouns and verbs, since they have no general name in the common grammars, he chooses to call *modificatives*: which include what grammarians commonly call *adverb, conjunction, and preposition*.

MODILLIONS, in *Architecture*, mutules carved into consoles, placed under the fessit or bottom of the drip of the corona in the Corinthian and Roman orders, for supporting the larnier and cyma, or appearing to perform the office of support.

In Grecian architecture, the Ionic order is without modillions in the cornice, and also the Roman examples of the same order, except the temple of Concord at Rome, which has both dentils and modillions.

A singular and curious example of a modillion cornice, but contrary to the principles of architecture, is to be found in the interior cornice of the Tower of the Winds at Athens, where the projecting part is much thicker than the interior part, where the stress seems to lie, and, consequently, gives the idea of weakness.

A singular example of modillions is to be found in the frontispiece of Nero at Rome, where they consist of two plain faces, separated by a small cyma reversa, and crowned with an ovolo and bead.

Another very extraordinary form of modillions is that placed in the frieze of the fourth order of the Coliseum, cut on the outside, or projecting part of a cyma reverse form.

In most examples of the Corinthian and Roman orders, the cornices have both dentils and modillions; but in our opinion, if the two are used together, in good proportion to the other parts, so as to appear distinctly at a reasonable distance, the cornice will be overcharged, both in proportion and weight, to the other principal members of the entablature, or the entablature to the whole order; the one or the other ought, therefore, to be omitted in the same cornice.

In the general disposition of modillions, if each one is conceived to be divided into two equal parts by a vertical plane at right angles to the surface of the frieze, one of the modillions is so disposed, that its dividing vertical surface will be entirely in a plane passing through the axis of the column, and

in the column next the angle of the building there is generally only one modillion between that through which the plane along the axis passes, and the angle of the corner.

The vertical sides of modillions at right angles to the face, are generally finished with volutes of different sizes, and turned on different sides of the same line, the greater being that next to the vertical surface, to which they are attached, and the lesser at the extremity.

The fessits of the modillions, so constructed, follow the under line of the volutes, and the connecting undulated line which joins them. The upper part of each volute is on the same level, and is attached to a moulding of the cyma inverse form, which returns round it, and this moulding is again attached to the corona, which hangs over the modillion.

In some of the Roman buildings the modillions are not placed over the axes of the columns, neither upon those at the extremes, nor over the axes of the intermediate shafts. In the Pantheon, the modillion next each angle of the building has its vertical side, which is opposed to the next modillion nearer to the central plane of the portico, over the axis of the column, and consequently the whole breadth of the modillion on one side of the axis entirely, and on that side next to the angle of the building. In the whole portico are forty-seven modillions, including the one at each extreme; the intervals are, therefore, forty-six in number, and forty-four between the columns that are between their axes. The portico is octo-style, and, consequently, the inter-columns are seven in number: from this it will be found, that if the columns were placed equidistantly, the number of inter-modillions would be 6^2 ths in number. In this temple the corresponding intervals are very irregular. The two extreme ones are, according to Desgodetz, $9' 4\frac{1}{2}''$, and $9' 2\frac{1}{8}''$: the next two, nearer the centre, are $9' 5\frac{1}{8}''$, and $9' 1\frac{1}{8}''$: the next two, still nearer to the centre, are exactly equal, being $9' 5''$ each, and the central intercolumniation is $10' 4\frac{3}{4}''$: so that the modillions appear to be equally divided, without any regard to the axis of the columns. The same irregularity in the disposition of the modillions may be observed in the temple of Concord, and in that of Jupiter the Thunderer. In the three remaining columns of the temple of Jupiter Stator, each column has a modillion placed over its axis, and each inter-column has three modillions regularly disposed: the distance between the lower ends of the shafts are 3 mod. 4 pa. $\frac{1}{2}$, and the columns are in height 20 modules, 6 parts $\frac{1}{2}$ ths.

In the Pantheon, the modillions are placed in the pediment, contrary to the authority of Vitruvius.

MODIŁOWA, in *Geography*, a town of Poland, in Volhynia; 36 miles N.E. of Zytomiers.

MODIN, a village of Palestine, situated on a hill, deserving of notice, on account of the tomb of the Maccabees, and also of a victory obtained by Judas Maccabæus, over Antiochus Eupator; 14 miles E.S.E. of Jaffa.

MODINAGUR, a town of Hindoostan, in Bahar; 25 miles E.N.E. of Hajipour. N. lat. $25^{\circ} 34'$. E. long. $85^{\circ} 51'$.

MODIOLI, in *Natural History*, a name given by some authors to the trochitæ or single joints of the rays of the petrified magellanic star-fish, which, when connected in numbers together, form that fossil called entrochus. Others have also used this word, *modiolus*, to express the compound body, or entrochus itself. Though the general form of the trochitæ be thin and flat, yet they are sometimes found considerably thick; and though the entrochi or compound modiola are usually so many cylinders of equal diameter in all parts, yet there are sometimes found such as are thick in the middle, and thence gradually taper to each end; some

also

also are composed of joints, each of this form; these differ very greatly from the common kind, and instead of consisting of a number of little wheels, are made up of a series of little barrels, joined, as it were, end to end.

MODIOLUS, from *modus*, a measure, in *Surgery*, since it was formerly so constructed, that it would only enter to a certain depth: the crown or saw of the trepan. Anciently it resembled in shape the nave of a wheel.

MODIUM, in *Geography*, a town of Norway, in the province of Aggerhuus; 20 miles W. of Christiania.

MODIUS, in *Antiquity*, a kind of dry measure in use among the Romans for several sorts of grain.

The modius contained thirty-two heminæ, or sixteen sextaries; or $\frac{1}{2}$ of the amphora; amounting to an English peck. See **MEASURE**.

MODIUS, FRANCIS, in *Biography*, a learned critic, was born at Oudenburg, in Flanders, in 1546. The wars of the Low Countries obliged him to retire to Cologne, and he spent the greater part of his life in Germany. Being at Bonne in 1587, he lost all his effects, and was himself dangerously wounded. Towards the close of life, he was presented with a canonry at Aire, where he died in 1597. Modius wrote annotations upon many of the Latin classics, which are mostly to be found in his "Lectiones Nov-antiquæ," which were first printed at Frankfort in 1584, and were reprinted in letters by Gruter, in the fifth volume of his "Thesaurus Criticus." He was author likewise of poems and other pieces. Moreri.

MODO & Forma, in *Law*, a phrase used in processes and pleadings, by which the defendant absolutely denies the thing charged on him by the plaintiff, *modo & forma declarata*, in the manner and form set forth.

The civilians in the like sense say, *negat allegata, prout allegantur, esse vera*.

MODON, in *Geography*, a sea-port town on the S.W. coast of the Morea; with a large and safe harbour. The town is the residence of a pacha, and see of a Greek bishop; 42 miles W.S.W. of Mistra. N. lat. 36° 58'. E. long. 21° 35'.

MODRITZ, a town of Moravia, in the circle of Brunn; five miles S. of Brunn.

MODRSAW, a town of Austrian Poland, in the palatinate of Cracow; 24 miles W. of Cracow.

MÖDRUSCH, a town of Austrian Croatia, the see of a bishop; 24 miles W.N.W. of Sluin.

MODULATION, from *Modulatio*, Lat., in *Music*, is one of the most important terms of a musical dictionary. In the articles **COMPOSITION** and **COUNTERPOINT**, it has been treated after our own ideas and experience; here we shall give our readers the rules laid down by others, not to confute, but to confirm and strengthen our own. And first, we should give Padre Martini's instructions, and those of Dr. Pepusch on the subject, as the most profound contrapuntists of Italy and Germany during the early part of the last century, if these learned theorists had not adhered so religiously to the ecclesiastical modulation of the old masters, founded on the modes or tones of the church, so as to preclude all the modulation of secular music, which has been extended, and in many instances improved, during the last hundred years. We shall, therefore, now chiefly translate and confine ourselves to the article *Modulation* in the dictionary of Rousseau, in which it is amply and clearly treated, according to the practice of the best masters at the time of his writing; that is, 30 or 40 years ago. See works on the same subject by subsequent writers still living, such as Fricke, Bemitzrieder, Kollmann, &c.

But first we must observe, that *to modulate* during the

sixteenth century, implied nothing more than a change of voice from one found to another; but the ingenious citizen of Geneva, more consonant to present practice in music, defines modulation, "the manner of establishing and treating a key;" but adds, that the word, at present, generally implies the art of conducting melody and harmony, successively, into many keys, in a manner agreeable to the ear, and according to rule. If the key is announced by harmony, it is from harmony that the laws of modulation arise.

These laws are easy to conceive, but difficult rigorously to observe. To modulate properly in the same key, we must begin first by running through all the notes of that key in good melody, frequently repeating its essential chords, and strongly marking them. That is, passing from the chord of the 7th to the 5th, or $\frac{1}{2}$ of the 7th to the key-note; but in various ways to avoid monotony. Secondly, to make no closes, nor to repose but upon those two chords, or at most on that of the 4th of the key, called by the French the subdominant, or 5th below the key. Thirdly, never to alter any of the sounds of the principal key by a flat or sharp, which would lead to another key.

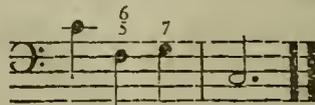
But to pass from one key to another, which is now understood to be the principal business of modulation, analogy must be consulted, with respect to the relation of keys, and the number of chords appertaining to two keys.

Let us begin by a major key, or key with a sharp 3d. Whether we consider the 5th of the key as being more immediately related and connected with it of any found except the octave of the key-note; or whether we regard it as the first found that is heard in the resonance of the key-note, the 5th will always be found the most agreeable interval upon which to establish a modulation the most analogous to that of the key-note.

The 4th of the key, if not a part of the chord of the key-note, the key-note is at least a part of the chord of the 4th. For if CEG form the chord of the key-note, that of the 4th will be F A C; thus C is the bond of union between the two keys. Indeed it is only necessary to change one found of the principal key to form the scale of its 5th above, and 5th below, or 5th and 4th of any major key. In the key of C, an F \sharp or a Bb does the business.

There are two minor chords in the key of C, in which only one note differs from the chord of C, as A c e, and e g B. But the sharp 7th, and other accidents which happen to the chords and melody of these minor keys, changes their character so much, that the double relation between the chords of C and A, and C and E is soon effaced.

As all the sounds of the scale of C are comprised in the chords of the key-note, and its two 5ths,



See plates throughout this article.

the gammut or scale of C, if altered only by one single sharp, furnishes the scale and chords of G, the 5th above C, which shews the great analogy between these two keys, and facilitates the means of passing from one to the other by one alteration only.



The key of the 5th is, therefore, the first which presents itself after the key-note in the order of modulation.

The same simplicity of relative sounds between the key-note and its 5th above is also found to subsist between the key-note and its 5th below, or 4th above.

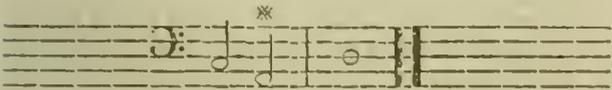


Though the modulating from C to A minor, its 6th, and from C to E minor, its 3d, is only by the change of one note in the chords, the sharp 7th must be heard in one of the chords of these minor keys, to make either A or E a key-note.



These immediate modulations furnish the means of passing to more remote keys by the same rules, and of returning afterwards to the key-note, of which we must never lose sight.

We have four regular modulations from the key of C major; EFGA. To modulate into D, wholly unrelative to C, it must be brought about by means of a consonant movement of the fundamental A with a sharp 3d.



But we must dwell but an instant in this modulation, lest the key of C is forgotten, which itself is altered in going into D. A long period in D would require intermediate modulations to return to C, into which it would be dangerous to wander. No good modulation into B, the sharp 7th of C, can have place, at least immediately, as it has no true 5th, and would lead to a harmony too sudden and remote from that of the principal key. In every modulation, all the parts must change the key at the same instant, to avoid carrying on two modulations at the same time. Huygens, says Rousseau, has well remarked, that the prohibition of two successive 5ths has this rule for its principle; for it is impossible to have many perfect successive 5ths between two parts, without modulating into two unrelative keys. The hexachords are composed of pure harmony to fundamental bases, without modulation. The descending scale in the *règle de Poëve*, modulates into the 5th of the key. But, in fact, only three notes in the base can ascend in one key, diatonically; the 4th note arrives at a new key to the top of the scale, which produces a perpetual modulation by 4ths, from C natural into all the 23 keys.

To modulate on a keyed instrument, is usually done in arpeggio, by preluding extempore, of which the variety, to a man of science, is unbounded. Abel, no lesson-player on the clavichord or harpsichord, possessed this talent to a wonderful degree.

MODULE, in *Architecture*, a certain measure taken at pleasure, for regulating the proportions of columns, and the symmetry or distribution of the whole building.

Architects usually choose the diameter or semidiameter of the bottom of the column for their module; and this they subdivide into parts or minutes.

Vignola divides his module, which is a semidiameter, into twelve parts, for the Tuscan and Doric; and into eighteen, for the other orders.

The module of Palladio, Scamozzi, M. Cambray, Def-Vol. XXIII.

gold-ty, Le Clerc, &c. which is also the semidiameter, is divided into thirty parts, or minutes in all the orders.

Some divide the whole height of the column into 20 parts for the Doric, 22½ for the Ionic, 25 for the Roman, &c. and of one of these parts they make a module, by which to regulate the rest of the building.

There are two ways of determining the measures or proportions of buildings: the first by a fixed standard measure, which is usually the diameter of the lower part of the column, called a module, subdivided into sixty parts, called minutes. In the second there are no minutes, nor any certain and stated division of the module; but it is divided occasionally into as many parts as are judged necessary. Thus the height of the Attic base, which is half the module, is divided either into three, to have the height of the plinth; or into four, for that of the greater torus; or into six, for that of the lesser.

Both these manners have been practised by the ancient as well as the modern architects; but the second, which was that chiefly used among the ancients, is in the opinion of Perrault preferable.

As Vitruvius, in the Doric order, has lessened his module, which, in the other orders, is the diameter of the lower part of the column, and has reduced that great module to a mean one, which is a semidiameter; M. Perrault reduces the module to a third part for the same reason, viz. to determine the several measures without a fraction. For in the Doric order, beside that the height of the base, as in the other orders, is determined by one of these mean modules; the same module gives likewise the heights of the capital, architrave, triglyphs, and metopes. But our little module, taken from the third of the diameter of the lower part of the column, has uses much more extensive; for, by this, the heights of pedestals, of columns, and entablatures, in all orders, are determined without a fraction.

As then the great module or diameter of the column has sixty minutes; and the mean module, or half the diameter, thirty minutes; our little module has twenty. See COLUMN.

MODULER, Fr. in *Music*; to modulate extempore is a research after new effects and new combinations. Learning, hand, and experience are necessary to do credit to the performer, and please and surprize the hearer. And we may add that a prelude, toccata, or voluntary by a great player, seems inspiration, and is worth a hundred pieces committed to paper.

MODULI CAMPANORUM, chimes. See Grassineau, p. 139, a long article on the subject. See CARILLONS.

MODUNDAH, in *Geography*, a town of Bengal; 18 miles N.N.E. of Calcutta.

MODUS DECIMANDI is when a parcel of land, a sum of money, or a yearly pension, belongs to the parson, either by composition or custom, time out of mind, in satisfaction for tithes in kind: or, when there is by custom a particular manner of tithing allowed, different from the general law of taking tithes in kind, which are the actual tenth part of the annual increase.

This is sometimes a pecuniary compensation, as twopence an acre for the tithe of land; sometimes it is a compensation in work and labour, as that the parson shall have only the twelfth cock of hay, and not the tenth, in consideration of the owner's making it for him: sometimes in lieu of a large quantity of crude or imperfect tithe, the parson shall have a less quantity, when arrived to greater maturity, as a couple of fowls instead of tithe eggs, &c. In short, any means by which the general law of tithing is

altered, and a new method of taking tithes is introduced, is called a *modus decimandi*, or special manner of tithing. In order to make a good and sufficient modus the following rules must be observed :

1. It must be certain and invariable. (1 *Keb.* 602.) 2. The thing given, in lieu of tithes, must be beneficial to the parson, and not for the emolument of third persons only. (1 *Roll. Abr.* 649.) 3. It must be something different from the thing compounded for. (1 *Lev.* 179.) 4. One cannot be discharged from payment of one species of tithe, by paying a modus for another. (*Cro. Eliz.* 446. *Salk.* 657.) 5. The recompence must be in its own nature as durable as the tithes discharged by it; *i. e.* an inheritance certain. (2 *P. Wms.* 462.) 6. The modus must not be too large, which in law is called a *rank modus*. (11 *Mod.* 60.) In these cases of prescriptive or customary moduses, the law supposes an original real composition to have been regularly made, which being lost by length of time, the immemorial usage is admitted as evidence to shew that it did once exist, and that from thence such usage was derived. Now time of memory hath been long ascertained by the law, to commence from the reign of Richard I. and any custom may be destroyed by evidence of its non-existence in any part of the long period from his days to the present. *Blackst. Com.* b. ii.

MODYPOUR, in *Geography*, a town of Hindoostan, in Bahar; nine miles S. of Patna.

MODZIEN, a town of Persia, in the province of Mazanderan; 48 miles S.W. of Astarabad.

MOECKARN, a town of the duchy of Magdeburg; 16 miles E. of Magdeburg.

MOEDA. See **MOIDORE**.

MOEN, or **MONA**, in *Geography*, an island of Denmark, in the Baltic, separated from the S. end of the island of Zealand, and from the N.E. coast of Falster, by a narrow sea, about 16 miles in length, and from three to five in breadth; containing one town, *viz.* Stoege or Stege, and several villages. N. lat. 55°. E. long. 12° 20'.

MOEN, or **MÖN**, a river which rises in Westphalia, three miles N.W. of Brilon, passes by Rhuden, &c. and joins the Roer at Nehem.

MOENCHIA, in *Botany*, received its name from Ehrhart in memory of Conrad Moench, a professor of botany at Hesse Cassel, author of the *Flora Hassiaca*. *Ehrh. Beitr. fasc.* 2. 177. This genus consists of only one species, *Sagina erecta*, Linn. Sp. Pl. 185. Sm. Fl. Brit. 200. *Engl. Bot.* t. 609. The only difference in the essential character consists in the structure of the capsule, which splits at the top into eight teeth, instead of separating, more or less perfectly, into four valves, like other *Saginae*. The habit of this elegant little plant must also be allowed to be dissimilar to that of the genus with which it has always been associated. See *SAGINA*.

MOERDA, See **MURDER**.

MÖERHINGIA, in *Botany*, was named by Linnæus in honour of Paul Henry Gerard Mörhing, a German physician, in the duchy of Oldenburg, who was the author of various botanical tracts. His first treatise appeared in 1733, entitled the anatomy of vegetables, in which the apparent structure of leaves, after being macerated in water, is particularly considered.—Mörhing printed a catalogue of his own garden in 1737, and furnished afterwards several papers for the *Ephemeries Naturæ Curiosorum*. He died in 1792, at the advanced age of 82 years. Linn. Gen. 195. Schreb. 264. Willd. Sp. Pl. v. 2. 439. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 416. Juss. 300. La-

marck Illustr. t. 314.—Class and order, *Ocandria Digynia*. Nat. Ord. *Caryophyllei*, Linn. and Juss.

Gen. Ch. *Cal.* Perianth inferior, of four lanceolate, spreading, permanent leaves. *Cor.* Petals four, ovate, undivided, spreading, shorter than the calyx. *Stam.* Filaments eight, capillary; anthers simple. *Pist.* Germen superior, globose; styles two, erect, the length of the stamens; stigmas simple. *Peric.* Capsule roundish, of one cell and four valves. *Seeds* numerous, roundish, convex on one side, angulated on the other.

Ess. Ch. Calyx inferior, of four leaves. Petals four. Capsule of one cell, and four valves.

1. *M. muscosa*. Linn. Sp. Pl. 515. Jacq. Austr. t. 449. (*Alnus saxifraga angustifolia minima montana*; Column. *Ecphr.* p. 1. 292. t. 290.)—Found growing in mossy situations, near trickling rills, on mountains in the south of Europe, flowering throughout the summer. *Root* perennial, thread-shaped and creeping. *Stems* annual, herbaceous, thread-shaped, round, slender, smooth, much branched. *Leaves* opposite, linear, very narrow, smooth, dilated at the base, so as to make the stem somewhat perfoliate. *Flowers* solitary, on long, erect, slender, axillary stalks. *Petals* ovato-linear, obtuse, milk white. *Capsules* yellowish when ripe. *Seeds* eight or ten, kidney-shaped, dark-brown, furnished with a large, white, jagged border to their scar of insertion.

MÖERIS, LAKE, in *Ancient Geography*, a lake of Egypt, concerning the situation and extent, and even the existence of which, authors have differed. It has been represented as the noblest and most wonderful of all the works of the kings of Egypt; and accordingly Herodotus considers it as much superior to the pyramids or labyrinth. As to its situation, Herodotus (lib. ii.) and Strabo (lib. xvii.) mark it out by placing the labyrinth on its borders, and by fixing the towns, which were round it, such as Achanthus to the south, Aphroditopolis towards the east, and Arsinoë to the north: Diodorus Siculus (lib. i.) and Pliny (lib. v.) confirm these authorities, by placing it at 24 leagues from Memphis, between the province of that name and that of Arsinoë. If the lake, like that of Mareotis, had totally disappeared, doubts as to its situation might still have been entertained; but the position marked by the above-mentioned historians leads us to a lake, actually existing, known by the name of *Birket Caroun*, (which see,) more than 50 leagues in circumference. With regard to the extent of this lake, we recur again to the testimonies above cited: Herodotus says, that the circumference of the lake Mœris was 3600 stadia, or 60 schenes, which, says the historian, form the dimensions of the maritime base of Egypt, (75 leagues.) He adds, that it stretches from N. to S. and that its greatest depth is 300 feet. The historian has fixed the measure of the schene in Lower Egypt at four miles, or $1\frac{1}{4}$ league, so that the 60 schenes make 75 leagues. If we compare the measures by Strabo and Diodorus Siculus, we shall find that the base of Egypt was estimated at 75 leagues, and hence it will follow, according to the account of Herodotus, that the lake was in circuit 75 leagues. Some writers, who have taken the usual measure of the stadium at 100 toises, have assigned to this lake a circumference of 150 or even 180 leagues. But as the historian has determined the measure of 3600 stadia to be 60 schenes, or 75 leagues, he must have made use of stadia of 50 toises each. Bossuet, the bishop of Meaux, has vindicated the statement of the largest extent of 180 leagues, which Voltaire has treated with raillery; and M. Rollin, conceiving it to be incredible, adopts the opinion of Pomponius

nus Mela, who says, that this lake is but 20,000 paces, that is, seven or eight French leagues in circumference. Pliny estimates it at 250,000 paces, or about 80 leagues. M. D'Anville, with a view of conciliating the different contending parties, has, in his map of Egypt, marked a great canal, to which he gives the name of the lake Mæris. The depth of 300 feet ascribed to this lake by historians must be exaggerated; but perhaps less so than we may be led to imagine. The bottom which it occupies is a basin, formed by the mountains. It is very low, since the Nile runs into it even by the canal of Tamiéh. Although the mud may have gradually collected in a series of ages, its depth is still very considerable. Two pyramids, says Herodotus, constructed in an island towards the middle of the lake, rise from 300 feet below the water, and are as high out of it. Each of them has on its summit a colossal statue, seated on a throne. Their total elevation, taken from the base, is a stadium of 600 feet; thus marking the measure of the stadium, as he had before, in giving the circumference of the lake, reduced it to 50 toises. These pyramids no longer exist; nor indeed did they exist in the time of Augustus, for they are not mentioned by Strabo. Lake Mæris, says Herodotus, occupies a soil very dry, and delituate of springs. It derives its waters from the Nile, which runs into it during six months; and during the remainder of the year it restores them to the river. During the former period, the fishery produces a talent of silver daily to the royal treasury, and 20 minas only during the latter. According to the natives of the country, a canal is pierced across the mountain, the extended chain of which commands Memphis. This is an outlet by which the superfluous waters are poured into the sands of Libya on the western side. As for the earth that was taken from the lake, the historian was informed, that it had been conveyed to the river, and carried by the current into the sea. According to the account of Strabo, the province of Arsinoë contains the wonderful lake of Mæris, which resembles the sea in its extent, its colour, and its shores. As deep as it is extensive, it receives at the beginning of the inundation the waters which would otherwise cover the harvests and the habitations of men; they are conducted thither by a large canal. When the Nile subsides, they return by two other canals (those of Tamiéh and of Bouch), which, as well as the former, serve for watering the fields, which is naturally performed. At the head of the canals sluices are formed, which are opened at pleasure; whether to introduce or to let off the waters.

At present this lake is only about 50 leagues in circuit; but this diminution by no means proves that Herodotus and Pliny were deceived in their calculations. Considering the revolutions to which Egypt has been subject for a series of 2000 years, it might have undergone still greater changes. The noble design of forming this lake is said to have been conceived by one of the Pharaohs, called Mæris, and he determined to change a part of the country, which was sandy and desert, into an useful lake. After the excavation had been made by the labour of some thousands of men, and at an immense expence, he drew a canal 40 leagues in length, and 300 feet wide, for the purpose of conducting thither a part of the waters of the Nile. This great canal, which still subsists entire, is known under the name of "Bahr Joufeph," Joseph's river. It opens near "Tarout Echerif," and ends at "Birket Caroun." As in several places this canal was cut out of the rock, the labour and expence must have been very great. It was not sufficient to have disengaged Egypt from the excess of the inundation, which in those remote ages remained too long on

the lands, at that time lower than they are in our days, and occasioned its sterility; it was necessary also to render these waters useful to agriculture. This great prince succeeded in doing this by drawing two other canals from the lake to the river. At their opening were formed two sluices, which were kept shut during the increase of the Nile; then the waters conveyed by the canal of Joseph were heaped up in the immense inclosure of lake Mæris, encompassed with dykes and mountains. During the six months that the Nile was on the decline, these sluices were opened, and a surplus of water of about 80 leagues in circumference, and 30 feet higher than the ordinary level of the river, formed a second inundation to be directed at pleasure. One part returned to the Nile, and served for the navigation. The other part branched out into innumerable rivulets, watered the fields, and diffused fertility even to the very sandy hills. This great work supplied the deficiency of water in years of a moderate overflow, by retaining those precious waters, which otherwise would have flowed uselessly to the sea. Its benefits were still more strongly marked in the time of a great inundation. It received that hurtful superfluity of them, which would have prevented the sowing of the earth. Lest this artificial sea should break down the barriers that were opposed to it, and cause frightful devastation in the country, a canal was cut through the mountains, by which the superfluous waters were poured into the sands of Libya. At present this lake has lost almost all its advantages. From the period of nearly 1200 years, since which Egypt has fallen into the hands of barbarous nations, they have either destroyed, or suffered to perish, the chief part of these monuments. The Marcotis is dried up, the canal of Alexandria is no longer navigable, and the Mæris is only 50 leagues in circumference. If the canal of Joseph were cleared out, where the mud is collected to a vast height, if the ancient dykes were re-established, and the sluices of the canals of Tamiéh and of Bouch restored, lake Mæris would still serve the same purposes. It would prevent the devastation, of the too great swellings of the rivers, and supply the deficiency of those which are inadequate. We should see it, as on former occasions, extending itself from Nesle and Arsinoë to the Libyan mountains, and offering to the view of the astonished traveller, a sea formed by the hand of man. Rollin's Anc. Hist. vol. i. Savary's Letters in Egypt, vol. i.

MOERSBERGEN, in *Geography*, a town of Holland, in the department of Utrecht; 10 miles E. of Utrecht.

MÆSIA, called by the Greeks *Myfia*, in *Ancient Geography*, a country of Europe, lay N. of Macedonia and Thrace, and extended from S. to N. as far as the right bank of the Danube. From W. to E. it extended from Pannonia, where the Drinus (Drin), passing to Sirmium and Singidunum (Belgrade), in order to discharge itself into the Danube, served for its boundary: to the W., comprehending the territory called "Pontus-Euxinus," from the promontory called "Hæmi-Extrema," and to the S. as far as the Istropolis. This large extent of country was divided into two distinct territories, partly by the mountains, and partly by the river Cæbrus (Zebris), which discharged itself into the Ister. The part comprehended between the Drinus and the Cæbrus was called "Mæsia Superior," and that which extended from the Cæbrus to the sea was called "Mæsia Inferior;" i. e. Upper and Lower Mæsia. The principal river of Upper Mæsia was the Margus (Morava), formed of two other rivers; and farther to the E. it had the Tinacus (Timak). The principal towns were Singidunum (Belgrade), Viminacium (Mioas), Bonomia (Vidin), and Ratiaria (Artzar). In the interior of the country is

Neiffus (Niffa); besides other places mentioned by Ptolemy. The principal rivers of Lower Mœfia were the Cœscus (Esker), the Osmus (Ofmo), the Utus (Vid), the Iatrus (Jantra), all which rivers ran from S. to N. and emptied themselves into the Danube: the Panyfus ran from W. to E., and discharged itself into the Euxine sea, near Odeffus (Vafna). The principal towns are, upon the Danube, Cœscus (Artzar), Nicopolis (Nicopoli), Duroftom (Drittra or Silhtria), Axopolis (Raffovat), and Trafmi. In the interior country were Sardica or Triaditza, near Sophia, Taurefium, the birth-place of Juftinian, called Juftiniana prima (Dginftendil), Nicopolis ad Hæmum (Ternova), Nicopolis ad Iatrum (Nicopi), and Marianopolis (Marienopoli). Upon the coasts of the Euxine sea, in the part called Scythia, and S. of this part, were Tomi (Temefwar), the place of Ovid's exile, Caria (Kalgri), and Odeffus (Varna).

MOESKIRCH, in *Geography*, a town of Germany, and capital of a lordship, belonging to the princes of Furitenburg; 18 miles N. of Conftance. N. lat. 47° 59'. E. long. 9° 14'.

MOESTLIN, MICHAEL, in *Biography*, a German Lutheran divine, and celebrated mathematician, who flourished in the 17th century, was born at Goppingen, in the duchy of Wirtemberg. He obtained the friendship and patronage of the duke, who sent him to the university of Tubingen, where he was quickly distinguished by his diligence and talents, and took his degrees. After this he embarked in the ministry, was chosen pastor of the town of Tetschen, and discharged the duties of his office to the satisfaction of his flock, and acquired universal respect by his unaffected piety and exemplary manners. He also obtained considerable reputation for profound skill in the mathematics, for which he had a sort of natural turn. On this account he was elected mathematical professor at Heidelberg, where he remained about three years, and then returned to Tubingen. Here he was appointed to the mathematical chair, in which he continued during the remainder of his life. He died in 1650. He is said to have been the first person who explained the cause of the pale light observable on the disk of the moon a little before and after the change. In Italy he delivered an harangue in defence of the Copernican system, and is thought to have influenced Galileo in renouncing the old hypotheses, and in embracing the system which has now obtained a sure footing. He published "Ephemerides," and several other works connected with science. Moreri.

MŒURS, Fr. morals, manners. Rousseau has treated this word as a musical term; and informs us that it constituted a branch of Greek music, under the title of "Hermofmenon," which consisted in knowing how to choose what was most beautiful and proper in each genus, without permitting musicians to give to each object and each character all the forms of which it was susceptible; but obliged them to confine themselves to what was most appropriate to the subject, the occasion, the persons, and the circumstances. The morals consisted further in so arranging and proportioning all the constituent requisites in musical composition, such as the mode, the time, the rhythm, melody, and even the transitions; so that in the entire piece there should be a conformity and agreement which left no disproportion; but that all its several parts should constitute one perfect whole.

To prescribe to what point of perfection an art should be carried, and reduce to rules what is decorous, fitting, and excellent, was a degree of refinement to which the moderns pretend not to have arrived.

MOEY, in *Geography*, a small island in the East Indian sea. S. lat. 5° 50'. E. long. 132° 50'.

MOFFAT, a large village in the county of Dumfries, Scotland, is situated upon the banks of the river Annan, at the distance of fifty miles south-west from Edinburgh, and is distinguished chiefly as the most celebrated watering place in the northern division of our island. It stands upon a considerable eminence, encompassed on the east, west, and north sides by hills of different heights, some of which are inclosed and cultivated, and others laid out as pasture lands. A fine holm, or valley, extends to the south, carrying in its bosom the limpid stream of the Annan. The principal street, declining in the direction of this vale, commands a charming view of it, for the space of several miles. The houses here are for the most part well built, and the streets are kept exceedingly clean and smooth; and from their height and gravelly foundation dry so rapidly, that in an hour after the heaviest rain, the inhabitants may promenade without the smallest inconvenience. There is one capital inn in the village, where the post-office is kept, and several lesser ones, as well as excellent lodging-houses, fit for the reception of the most genteel families. Here are an assembly-room and a bowling-green.

The Moffat Well is situated about a mile and a half from the village, having an excellent carriage road leading to it, and a long room, stables, and other conveniences for the accommodation of the company when they are stationed there. The valuable medicinal properties of this well were first discovered about 160 years ago; since which time it has been constantly held in great estimation. Its waters are powerfully diuretic, and generally allowed to be effectual in the cure of scurvy and scrophula, if the patient's lungs are not injured previously to the use of them. When poured into a glass the water sparkles like champagne, and is so extremely volatile that it cannot be drunk in perfection, unless at the fountain. According to the late Dr. Garnet, who paid considerable attention to this subject, when analysed, it is found to contain of muriat of soda (common salt) 36 grains; sulphuretted hydrogen gas 10 cubic inches; azotic gas 4 ditto; carbonic acid 5 ditto.

At the distance of four miles from Moffat, is another mineral spring, called the Hartfell Spaw, because issuing from a rock of alum-slate in a tremendous ravine, on the side of a mountain of that name. The chief mineral substances of this water are the sulphats of iron and alumina, which give it a powerful tonic quality. It is principally used, therefore, in cases of weakness; but has likewise been found serviceable in tettersous complaints and obstinate old ulcers. This well is honoured with high encomiums by Dr. Johnson. Several ether chalybeate and petrifying springs have been discovered in the country adjacent to this village. One at Evan-bridge is equal in strength to the wells at Harrowgate, but it has hitherto been entirely neglected.

The vicinity of Moffat is no less fruitful in remains of antiquity than in salubrious springs. Part of a Druidical temple is still visible close to the bank of a rivulet which passes out of a small lake, and falls into the water, deriving its name from the village. Near this spot are likewise vestiges of a Roman road; and several stations and encampments of that people. A piece of gold was found a few years ago in a moss adjoining to the road, which is supposed to have formed part of some military ornament. Its outer edge was adorned with a border, in which were the following letters formed by cutting through the interstices, IOV. AVG. VOT. XX. Vestiges of a British encampment may be seen about three miles south-east from the village. On the road between it and the well is a large mound,

of a conical form, with a very deep ditch round it: another of smaller dimensions stands at the distance of a few hundred yards. A mile east from the Roman road are two caves, cut out of free stone rock; they are of a large size, but by whom formed, or for what purpose, it is difficult to conjecture. Many ruins of old towers are visible in this parish, as well as in the adjoining one of Kirkpatrick-juxta; some of which are placed in small enclosures, defended by walls and ditches. Among the more remarkable of the entrenched parks, as they are called, is the park of Achencafs, where the walls measure 15 feet in thickness, and upwards of 20 in height.

According to the parliamentary returns of 1801, the resident population of this parish amounted to 1610 persons, *viz.* 748 males, and 871 females. Sinclair's Statistical Account of Scotland.

MOFFEN ISLAND, in *Geography*, an island in the North sea, N. of Spitzbergen; it is of a round form, about two miles in diameter, with a lake or large pond of water in the middle, and between this lake and the sea the ground is from half a cable's length to a quarter of a mile broad: the whole island, besides this pond, is covered with gravel and small stones, without the least verdure or vegetation of any kind. The navigators of the *Caracas*, who visited this island, saw only one piece of drift wood, about three fathoms long, with a root on it, and as thick as the ship's mizen-mast, which had been thrown up near the high part of the land, and lay upon the declivity towards the pond. They also saw there bears, and a number of wild ducks, geese, and other sea-fowls, with bird's nests all over the island. They found an inscription over the grave of a Dutchman, who was buried there in July 1771. The tide seemed to flow eight or nine feet, and a current was found which carried the ship to the N.W. from the island, but which before carried it to the S.E., at the rate of a mile an hour, towards it. On the W. side is a fine white sandy bottom, from two fathoms, at a ship's length from the beach, to five fathoms, at the distance of half a mile. It is remarked, as surprising, that no notice should be taken of this island by the old navigators; unless it may be supposed that it did not then exist, and that the streams from the great ocean up the W. side of Spitzbergen, and through the Waygat's shoals, meeting here, raised this bank, and occasioned the quantity of ice that generally blocks up the coast in its vicinity. N. lat. $80^{\circ} 5'$. E. long. $12^{\circ} 30'$. Phipps's Voyage towards the North Pole.

MOFHAK, a small town of Arabia, in the province of Yemen, situated on the summit of a steep hill. This town has a dola. The revenue of the town, and of the territory annexed to it, is enjoyed by one of the Imam's sons. Mofhak lies in the route from Sana to Beit el Fakih.

MOGADOR, or Mogodor, called also by the Moors *Suera*, a town of Morocco, in the province of Hea, which received its name from a faint, held here in great veneration, by the name of Sidi Mogodor, whose tomb is to be seen at a small distance to the south of the town. It had formerly a wretched castle, built by the Portuguese, to preserve a communication with their settlements to the south of this coast; and also to protect the entrance of a harbour, formed by a channel between the main land and a small island. The situation appearing favourable for a place of trade, the emperor resolved to found a city here; and the wealthier Moors began to build houses, to gratify the wishes of their sovereign. Foreign merchants were invited to do the same; and with a view of inducing them to comply with the emperor's wishes, large abatements were offered in the custom duties; but promises to this purpose were not very scrupu-

lously observed. This city was begun in 1760, and has since been completely finished. It contains a great number of houses, handsomely and solidly constructed. The streets are all straight lines, and there is no town in the empire in which a regularity of plan is so strictly observed. It is surrounded with walls, and batteries are erected, not only on the sea-side, but towards the land, to defend it from any incursion of the southern Moors. The emperor has brought all the European merchants to settle at Mogodor, and, notwithstanding its distance from Europe, it is the only port on the coast which maintains a continual commercial intercourse with that quarter of the world. This city stands on marshy ground, and so low, that, at spring-tides, it is almost surrounded by the sea. The country about it is a melancholy desert of accumulated sand. The Europeans, however, have the advantage of a more easy communication with the southern provinces, which, by exchanging their productions for the commodities of Europe, render the trade of this place very flourishing. The port of Mogodor is formed by a channel between the main land and an island more than a mile in length. The entrance of this channel is to the north-west, and its outlet to the south. It is sufficiently large for ships of a middling size, but in general it has not sufficient depth; and this disadvantage is daily increased by the accumulation of sand. The number of ships which have been lost in this port in winter, by violent storms from the south-west, sufficiently prove how very dangerous it is in bad weather; 80 miles S.W. of Morocco. N. lat. $31^{\circ} 30'$. W. long. $9^{\circ} 30'$. Chemer.

MOGADOURO, a town of Portugal, in the province of Tras-los-Montes; 22 miles S.W. of Miranda di Duero.

MOGAMI, a town of Japan, in the island of Nippon; 110 miles N. of Jedo.

MOGANOOR, a town of Hindoostan, in Bahar; 11 miles S of Namacul.

MOGARO, an island in the gulf of Venice, near the coast of Friuli. N. lat. $45^{\circ} 47'$. E. long. 31°

MOGATA, a town of Sweden, in East Gothland; 7 miles E. of Soderkioping.

MOGGIO, in *Commeroe*, an Italian corn measure, which at Florence contains 8 facchi, or 24 staja; the stajo being 4 quarti, 16 metadeli, or 32 mezzete: the moggio contains about 16 English bushels. At Leghorn, a moggio contains 2 rubbi, or $7\frac{1}{2}$ facchi; a sacco, 3 staja, or 384 buffoli. A sacco of good wheat weighs about 168 lb. of Leghorn, and contains 3720 French, or 4503 English cubic inches; so that 43 sacs of Leghorn are equal to 90 English bushels. See Tab. XXXI. under the article MEASURE.

MOGGURAH, in *Geography*, a town of Bengal; 8 miles N.W. of Goragot.

MOGHOSTAN, the denomination by which the southern part of the province of Kerman, in Persia, is distinguished.

MOGILEV, a town of Russia, and capital of a government, on the river Dnieper. The town is handsome and commercial, and a place in which the Russians carry on a considerable trade. It was taken from the Russians by the Poles in 1662; and by the division of Poland, in the year 1773, it was ceded to Russia, with its territory, and erected into an archbishopric of the Roman church, with an assistant bishop; 340 miles E.N.E. of Warsaw. N. lat. $53^{\circ} 52'$. E. long. $30^{\circ} 14'$.

MOGILEVSKOE, a government of Russia, bounded on the north by the government of Polotsk, on the north-east by that of Smolensk, on the south-east by that of Novgorod Sieverskoe, on the south by that of Tchernigov, and on the

west

west by Poland; about 176 miles in length, in its widest breadth 120, in the north part 68, and in the south only 24. N. lat. 52° to 55° . E. long. 29° to 33° .

MOGILNICA, or MOULNICZA, a town of the duchy of Warfaw; 36 miles E. of Rawa.

MOGIMERI, a town of Brazil, in the government of St. Paul; 35 miles E. of St. Paul.

MOGLA, or MULLA, a town of Asiatic Turkey, and principal place of a Sangiacat, in Natolia, on the ruins of the Alinda; 100 miles S.E. of Smyrna. N. lat. $37^{\circ} 8'$. E. long. $28^{\circ} 22'$.

MOGLE, a town of Bosnia; 35 miles E. of Banjaluka.

MOGNA, a town of Italy, in the Feltrin.

MOGO, a town of Persia, in Laristan, on the coast of the Persian gulf; 40 miles W. of Lundsje.

MOGONTUEVSKOI, a town of Russia, in the government of Irkutsk, on the borders of China; 60 miles S.S.E. of Dorouinsk.

MOGORIN, in *Botany*, a name given by the Portuguese to an Indian or Chinese flower, growing on a small shrub. It is of a wonderful white colour, and not unlike the *ginseng*, only that it abounds more with leaves, and smells much sweeter; one single flower filling a whole house with its odoriferous effluvia. On this account the Chinese put a high value upon it, and carefully defend the shrub it grows on from the inclemency of the winter, by covering it with vases provided on purpose.

MOGORIUM, a name of barbarous origin, applied by Jussieu, *Gen.* 106, to such of the Linnæan species of *Nyctanthes*, as have a pulpy fruit, the calyx and corolla of such being perfumed to have at least eight divisions; and the real *Nyctanthes*, being agreed to have a dry capsular fruit, besides other marks of distinction. Sir Joseph Banks and Dr. Solander have referred all the above-mentioned species to JASMINUM, (see that article,) in which they have been followed by Vahl and Willdenow. The measure is justified by the variability of number in the parts of these flowers, even on the same individual plant, and the strong generic affinity between them all, independent of number. Such as have naturally a five-cleft flower, very commonly acquire one, two, or three additional segments; and those which have naturally eight, as *J. Sambac*, are liable to have twelve or more, without any obliteration of their organs of impregnation. When the latter takes place, the divisions of the corolla become greatly multiplied, as in other common instances.

MOGRABIANS, MOGARBA, or *Men of the West*, in *Military Language*, a name given to the infantry of the Turks, composed of the peasants of Tunis, Algiers, and Morocco, who have thought proper to seek in Syria and in Egypt that respect which is denied them in their own country. All the accoutrements and baggage of these soldiers are confined to a rusty firelock, a large knife, a leathern bag, a cotton shirt, a pair of drawers, a red cap, and sometimes slippers. Their pay is 5 pialtres (about 10s. 10d.) per month, out of which they are obliged to furnish themselves with arms and clothing. They are maintained at the expence of the pacha, &c.

MOGUAR, in *Geography*, a town of Spain, in the province of Seville, at the mouth of the Tinto; 43 miles W. of Seville. N. lat. $37^{\circ} 12'$. W. long. $6^{\circ} 58'$.

MOGUL EMPIRE, in an extensive sense, denotes that empire of Asia, over which Tamerlane and his immediate successors reigned, and in which India was not included; but in a more restricted sense, it signifies, as custom has in later times appropriated the name, that empire which was

held by the descendants of Tamerlane in Hindooftan and the Deccan. The origin of the Mogul empire is so far remote, that it is difficult to distinguish between fabulous tradition and the records of authentic history. It probably arose from small beginnings, and extended itself by the conquests of ambitious princes. It appears, however, to have been of very limited extent, if indeed it existed at all under this appellation, when Temujin, better known under the name of Jenghiz Khan, or Gengiz Cawn, made his appearance. The birth of this conqueror is referred to the year 1163; and at the time of his father's death, his subjects are said to have amounted to between 30,000 and 40,000 families: but a majority of these revolted, and in the earlier part of his life and reign he was left almost without any subjects. He rose, however, into notice and power, under the protection of Vang Khan, who was sovereign of a considerable number of Tartar tribes, situated to the north of Kitay, or China, and who has been known among Europeans by the name of Prester John. Thus encouraged and aided, he subdued those subjects who had revolted in the year 1201, and was able to keep possession of his throne. It was not long, however, before Vang Khan became jealous of the growing power, and perhaps manifest ambition, of Temujin, whom he had made his general; so that he contrived treacherous measures for destroying a prince, whom he considered as his rival. This disagreement terminated in an open war, which Temujin prosecuted with success. Vang Khan was defeated in a battle, by which he lost 40,000 men; and soon after was ungenerously put to death by the father-in-law of Temujin, to whom he had fled for refuge. The conqueror seized on the dominions of the vanquished Khan, and rapidly extending his marches and victories, reduced all the Mogul tribes in the year 1205. In a diet, held in the spring of the following year, to which all the great lords both of the Moguls and Tartars were summoned, the Mogul empire was confirmed to him and his successors, together with those kingdoms which he had subdued, and he was solemnly proclaimed emperor. During his inauguration, a prophet is said to have appeared in the assembly with a divine message, declaring that from this time Temujin should assume the name of "Jenghiz Khan, or the most great khan of khans;" and at the same time predicting, that his posterity should be khans from one generation to another. Thus established on the throne, and held in the most profound veneration by his subjects, he projected the extension of his dominions by more conquests. He began with the emperor of Hya, the western part of the empire of Kitay, and in 1209 compelled him to become his tributary: and when, in 1210, an acknowledgment of his being tributary to the emperor of Kitay was demanded of him, he resisted the demand, the consequence of which was a war, that terminated in the dissolution of the Kitay empire. In the year 1216 he resolved to carry his arms westward, and, in his progress, defeated an army of 300,000 Tartars, who had revolted; and in 1218 he deputed ambassadors to express his desire of an alliance with Mohammed Karazm (Charasm) Shah, emperor of Gazna or Ghizni. Although the alliance was concluded, it was soon treacherously violated; and this event occasioned a war, which in 1221 accomplished the conquest of the empire of Ghizni, and thus terminated the dynasty of Charasm. Jenghiz Khan, however, left Hindooftan undisturbed. After the reduction of Charasm, some of the Moguls marched into Iran or Persia, where they made extensive conquests; and others invaded Georgia, and the countries lying west of it, committing in their progress the most atrocious enormities. In 1225 Jenghiz Khan returned to Hya, slew the emperor, and destroyed

stroyed the country. But this was the last exploit of this ambitious and savage conqueror, who died in 1227, as he was marching to complete the destruction of the Chinese. At the death of Jenghiz Khan, the Mogul empire extended over a prodigious tract of country; being, as it has been said, more than 1800 leagues in length from east to west, and upwards of 1000 in breadth from north to south. The successors of Jenghiz Khan, urged by an insatiable ambition, pursued the same plan of conquest; so that Oktay was acknowledged emperor after Jenghiz, and had under his immediate government Mogulestan, or the country of the Moguls properly so called, Kitay, and the countries to the east of the Tartarian sea. His brother Jagatay governed under him a great part of the western conquests. The country of the Kipjacks, and others to the east and north-east, north and north-west, were governed by Batu or Patu, the son of Juji, who had fallen in the wars; while Tuli or Tolay, another son of Jenghiz Khan, had possession of Khorasan, Persia, and that part of India which had been conquered. On the east side the Mogul arms prevailed, and subdued not only the empire of Kitay, but the southern part of China. In the year 1254, Magu, or Menkho, the fourth khan of the Moguls, raised a large army, and gave the command of it to his brother Hulaku, or Hulagu, for the purpose of extending his dominions towards the west. With this army, in 1255, he invaded Iran, suppressing the Ismaelians or Assassins; and two years afterwards he advanced to Bagdad, which he captured. Cruelty and devastation marked the footsteps of the Moguls; fire and sword were the implements of their warfare; and it is said, that in Bagdad, and its vicinity, the number of slain amounted to 1,600,000. In the following year he invaded Syria, took possession of Damascus without resistance on the part of the inhabitants, whose lives were therefore spared; and having captured Aleppo by storm, murdered the inhabitants, without sparing even the children in their cradles. These cities, which in the succeeding year revolted, were again taken by the Moguls and plundered, and the inhabitants were either slaughtered without mercy, or carried into slavery. Hulaku died in 1264; and at the time of his decease we may fix the greatest extent of the Mogul empire. It comprehended the whole of the continent of Asia, excepting part of Hindoostan, Siam, Pegu, Cochinchina, and a few of the countries of Lesser Asia, which the Moguls had not attacked. From this period, however, this vast and overgrown empire began to decline. The ambitious khans failed in their attempts upon Japan and Cochinchina, and also upon Hindoostan; and the empire itself was divided into several smaller partitions. The governors of Persia, being of the family of Jenghiz Khan, owned no allegiance to any superior; those of Tartary pursued the same course; the Chinese threw off the yoke: and thus the continent of Asia assumed, in a great degree, the same aspect which it had before Jenghiz Khan began his conquests. At length, in the year 1369, Timur Bek, or Tamerlane, one of the petty princes of this broken empire, having conquered a number of others, was crowned at Balk, with the pompous title of "Sakeb Karan," *i. e.* the emperor of the age and conqueror of the world. He began his reign with the exercise of various cruelties.

In 1370, Timur crossed the Sihon, made war on the Getes, and attacked Charasm. In 1379 he had fully conquered the country of the Getes, as well as Khorasan; and from that time he pursued his conquests, as Jenghiz Khan had done, though with less cruelty. In 1387, he had reduced Armenia, Georgia, and the whole of Persia; the conquest of which last country was completed by the reduction of Ispa-

han; 70,000 of the inhabitants of which city were slaughtered on account of the sedition of some disaffected persons. After the reduction of Persia, Timur turned his arms northward and westward, subduing all the countries as far as the Euphrates. He took the city of Bagdad; reduced Syria; and having ravaged a great part of Russia, returned in 1396 to Persia, where he made a splendid seat for his whole army. After several irruptions which had been made by the Moguls into Hindoostan, after the death of Jenghiz Khan, Timur, who had already extended his empire over all the western Asia and Tartary, turned his arms towards this country in 1398. In the preceding year he had sent his grandson Peer Mahomed to reduce the Panjab and Moultau, and in October crossed the Indus himself; and joining his grandson near Moultau, his army proceeded in different divisions to Delhi, which submitted without what may be properly termed a battle. The massacres and exterminations that succeeded his taking possession of the city, were executed under his immediate direction; and justly entitled him to the appellation of the "destroying prince." Timur staid in Delhi only 15 days; and then appears to have been on his return to the seat of his empire, when, hearing of a fortress in the Doob that had resisted the arms of a former Mogul invader, he marched towards it and took it. From thence he proceeded to the place where the Ganges issues out of the mountains, and where the Hindoos resort at certain seasons, in vast numbers, to pay their adorations to, and to purify themselves in, that sacred stream. His object was the extermination of these inoffensive people; and he partly succeeded. From this place, turning to the N.W., along the foot of mount Sewalick, he continued his massacres, though not without opposition, until he arrived on the frontiers of Cashmere. He spent little more than five months, between the time of his crossing and recrossing the Indus, and in doing this he paid greater attention to the seasons than Alexander had done. Timur, however, may be said rather to over-run than to conquer or subject; for he did not disturb the order of succession in Hindoostan, but left Mahmood on the throne; referring to himself the possession of the Panjab country only; which his successors did not long retain. His views were at this time directed towards the Turkish empire; and this circumstance induced him to neglect India, which did not promise so plentiful a harvest of glory as the other. During his life, which terminated at Samarcand in the year 1405, he was prayed for in the mosques of Hindoostan, and the coin was struck in his name; but this might be more the effect of policy in the usurpers of Mahmood's throne than the act of Timur. On Timur's death his empire fell into great disorder, and was distracted by civil wars, till at length peace was restored by the settlement of Shah Rukh, Timur's son, on the throne. The empire subject to his dominion was much reduced; Chorasam, Khorasan, Candahar, Persia, and part of Hindoostan being the countries of which it consisted. By him his dominions in this reduced state were transmitted to his son Ulug Beg, well known by his astronomical tables. A succession of princes filled up the interval till the death of Abusaid Mirza, a lineal descendant of Timur. From this time we may consider the empire of Timur as dissolved, though his descendants still reigned in Persia and Hindoostan.

The conquest of Hindoostan was effected by Sultan Baber, a descendant of Timur or Tamerlane, and Jenghiz Khan. This prince reigned over a kingdom composed generally of the provinces situated between the Indus and Samarcand. Being dispossessed of the northern part of his dominions by the Uzbeks, he determined to try his fortune in Hindoostan, whose distracted state under Ibrahim II. in 1516, encouraged his hopes

hopes of conquest. His first expedition from Cabul, where he resided, across the Indus, was undertaken in 1518; this was succeeded by four others; and in the fifth (A.D. 1525), he defeated the emperor of Delhi, and put an end to the dynasty of Lodi. He reigned only five years in Hindoostan, chiefly employing himself in the reduction of the eastern provinces. It was in the person of Baber that the line of Tamerlane first mounted the throne of Hindoostan; and it was in that of Acbar, his grandson, that it was established. The conquest of their ancestor, about a century and a half before, had no share in effecting the present settlement. Baber was, in reality, the founder of the Mogul dynasty; and from this event Hindoostan derived the appellation of the "Mogul empire." The princes of the house of Timur have since their first establishment on the throne eagerly pursued the conquest of the Deccan, not considering that this region, which possessed ample resources within itself, and innumerable advantages in point of security from an enemy without, was also situated at such a distance from the capital, as to hold out to its viceroy the temptation of independence whenever a favourable opportunity offered. Perhaps, says major Rennell, if the Deccan had been originally left to itself, the posterity of Timur might still have swayed the sceptre of Hindoostan. In process of time the Mogul empire became merely nominal; and the emperors were regarded as of no political consequence, otherwise than as their names and persons are made use of by different parties to forward their own views. The Mogul empire attained its full measure of extent under the reign of Aurungzebe, see his article. In this empire many parts of it were 1000 miles distant from the seat of government; and accordingly its history is one continued lesson to sovereigns, not to grasp at too much dominion, and to mankind to circumscribe the undertakings of their rulers. Rennell's *Me. moirs*, *Introd.* See DECCAN, DELHI, and HINDOOSTAN. See also MONGOLIS.

MOGULISTAN, or MOGOLISTAN, the country of the Mogul Tartars. In a larger sense, this term comprehends the whole of Tartary, from the Caspian to the North Atlantic; but, in a more restricted sense, to an extensive tract of country between Bucharia and China, north of Thibet. See *MOGUL Empire* and MONGOLIS.

MOGULMARY, a town of Bengal; 18 miles S. of Burdwan.

MOGULPOUR, a town of Hindoostan, in the circar of Schaurunpour; 36 miles S.S.W. of Schaurunpour.

MOGULPURRAH, a town of Hindoostan, in Bahar; 18 miles N.N.W. of Bahar.

MOGULS. See MONGOLIS.

MOGULSERAI, a town of Hindoostan, in Benares; 10 miles S.E. of Benares.—Also, a town of Hindoostan, in the circar of Sirhind; 15 miles N.N.E. of Sirhind.—Also, a town of Hindoostan, in the country of Agra; 24 miles N.N.W. of Kerowly.

MOGURANI, a town of Walachia; 48 miles N. of Bucharest.

MOGWITZ, a town of Silesia, in the principality of Neisse; 6 miles N.N.E. of Ottmucha.

MOGYESZO, a town of Hungary; 12 miles W. of Tokay.

MOHACS, a town of Hungary, on the Danube; 56 miles W. of Zegedin. N. lat. 46° 2'. E. long. 18° 44'.

MOHADAN, AL, a town of Arabia, in the province of Hedsjas; 80 miles E. of Madian.

MOHADY, a town of Hindoostan, in Berar; 31 miles E.N.E. of Nagpour.

MOHAIR, in *Commerce*, the hair of a kind of goat, frequent about Angora in Turkey; the inhabitants of which city are all employed in the manufacture of camblet made of this hair. See CAMELET and CAPRA *Angorensis*.

Some give the name mohair to the camblets or stuffs made of this hair: of these there are two kinds; the one smooth and plain; the other watered like tabbies: the difference between the two only consists in this, that the latter is calendered, the other not. There are also mohairs both plain and watered, whose wool is of wool, cotton, or thread.

MOHAIR-Shell, in *Natural History*. See MOIRE.

MOHANG-LENG, in *Geography*, a town of the kingdom of Laos, so called by the Chinese; *Mohang*, in the language of the country, signifying town. It is of considerable extent, but only enclosed with a palisade; on the west are large forests and several rivers. This city stands on both sides of a river, called Meinam Tai, which, by the Chinese accounts, joins the river of Siam. Fish is rare, but buffalo and venison are common in the markets.

MOHANOO, a town of Hindoostan, in the circar of Chanderee; 33 miles W. of Chanderee.

MOHASSIL, formerly called "Disferdar," an officer at Aleppo, is reckoned the second person of the city in the civil line, and, on the demise of the bashaw, is by the Divan usually appointed Mutulleem, or temporary governor, till orders come from the Porte. He is farmer-general of the land-tax, the customs, and the capitation tax; on which account he is obliged to retain a number of subordinate officers dispersed in the province, and to perform considerable business. He exercises a limited judicial power in matters of revenue, and has a prison in his own palace. The Mohassil's influence is considerable: he lives splendidly, and is much courted by the agas or land-renters, as well as by the merchants. He is, from his office, one of the members of the Divan, or council.

MOHAUN, a town of Hindoostan, in Oude; 15 miles N. of Lucknow.

MOHAWK BAY, a bay in Fredericksburg, Upper Canada, which lies opposite to Mohawk's settlement, and close to the mouth of the river Apannac.

MOHAWK River, a river of New York, which rises to the northward of Fort Stanwix, about eight miles from Black or Sable river, a water of lake Ontario, and runs southwardly 20 miles to the fort, then eastward 110 miles, and after receiving many tributary streams, falls into Hudson's river, by three mouths, opposite to Lonfinburgh and Troy, from seven to ten miles N. of Albany. This fine river is navigable for boats from Schenectady, nearly or quite to its source; and the opening of this navigation by means of the locks and canals round the Little Falls, completed in 1795, is very advantageous to the commerce of the state. A shore of at least 1000 miles in length is thus washed by boatable waters, exclusive of all the great lakes; and many millions of acres of excellent tillage land, rapidly settling, are accommodated with water communications for conveying their produce to market. The intervals on both sides of this river, of various widths, are some of the richest and best lands in the world; and are distributed into farms, which are occupied and cultivated principally by Dutch people, whose agricultural practice admits of great improvement, as they neglect to employ the manure of their barns in the culture of their land. The banks of this river were formerly thickly settled with Indians; and at the period when Albany was first settled, it is said that at Schenectady there were 800 warriors, and that 300 warriors subsisted within a space now occupied by a single farm. About three miles

from its entrance into the Hudson, the river is about 1000 feet wide; the rock over which it pours, as over a mill-dam, extends from S.W. to N.E. almost in a line from one side of the river to the other, and is about 40 feet in perpendicular height, and including the descent above, the fall is as much as 60 or 70 feet. About a mile below the falls is a handsome bridge; and immediately below the bridge the river divides into three branches, which form several large islands.

MOHAWK, or *Cookquago*, a branch of Delaware river, which, after it mingles with the Popachton branch, is called Delaware.

MOHAWK, formerly a town on the S. side of the river of the same name, in Montgomery county, New York, situated in a very fertile country. It was abandoned by the Mohawk Indians in 1780.

MOHAWKS, an Indian nation, acknowledged by the other tribes of the Six Nations to be the true old heads of the confederacy. They were formerly very powerful, and had their habitation on Mohawk river. As they were strongly attached to the Johnson family, a part of them emigrated to Canada with Sir John Johnson as early as the year 1776. About 300 of this nation now reside in Upper Canada.

MOHAWK Settlement is in the bay of Quinti, Upper Canada, W. of Richmond, and comprehended between the river Shannon and Bowen's creek.

MOHAWK Village, on the Grand river, or Ouse, in Upper Canada, is the principal village of the Six Nations, in the tract purchased from the Mississauga nation, by his present majesty, on account of their loyalty and attachment during the late revolution, in which they lost their possessions on the Mohawk river. This tract is 100 miles long, and 12 wide, intersected by Grand river, from its mouth in lake Erie upwards. The village is beautifully situated, has a neat church with a steeple, a school-house, and a council-house; and not far from it a grist and a saw-mill. These buildings have for the most part been erected by government, which pays a miller, schoolmaster, and blacksmith, for their services at the village; and the society for propagating the gospel makes an allowance to a clergyman of the established church for occasional visits to these tribes. The liturgy of the church of England has been translated into the Mohawk language, and printed for the use of the Six Nation Indians. In 1800, this nation, the Seneca and Oneida pagans, revived their custom of sacrificing white dogs to their gods, which had been neglected for 30 years, under a notion that the neglect of this sacrifice had been one cause of their various misfortunes.

MOHAWKS' Corn, in *Botany*, a name given by the Indians to a peculiar sort of the maize, or Indian corn. It is most frequent in the more northerly parts of America. The general time of sowing the maize in Virginia and other places, is in the end of April; but this mohawk kind need not be sown before June, and yet will come well to maturity before the winter. The stalks of this kind are shorter than those of the common sort. The ears also are shorter and grow nearer the ground, and the corn is generally of various colours. Phil. Transf. N^o 142.

MOHAWK. See *Mock*.

MOHAWRY, in *Geography*, a town of Hindoostan, in the circar of Chanderee; 45 miles W. of Chanderee.

MOHEGAN, a place situated between Norwich and New London, in Connecticut, in America; which is the residence of the remaining few of the Mohegan tribe of Indians. A considerable part of this small number removed lately to Oneida, with the late Mr. Occom.

MOHELNO, a town of Moravia, in the circle of Znaym; 24 miles N. of Znaym.

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MOHERNANDO, a town of Spain, in New Castile; 10 miles N. of Guadalajara.

MOHERRY, a town of Hindoostan, in the circar of Cicacole; 20 miles S.W. of Ganjam.

MOHIGONG, a town of Hindoostan, in the circar of Ruttumpour; 16 miles S.E. of Dumdah.

MOHICCONS, a tribe of Indians, whose habitations lie on a branch of the Susquehannah, between Chagocet and Gwegy. Hutchins, some years ago, reckoned them at 100, but Imlay, in 1773, estimates them only at 70 fighting men. They were formerly a confederate tribe of the Delawares.—Also, an Indian tribe, in the N.W. territory, which inhabits near Sandusky, and between the Scioto and Muskingum: their warriors are reckoned to be 60.

MOHILA, one of the Comora islands, in the Indian sea, between the island of Madagascar and the coast of Africa. It has a good road for ships, and it is said to be fertile. It is governed by a sultan, whose children share his authority in different districts of the island, bear the same appellation, and possess the same insignia of state, though they hold their power in subordination to him. The sultan himself never appears in public, without being attended by 20 of the principal persons of the island, and on such occasion his dress is a long robe of striped calico, hanging from his shoulders to his feet, with a turban on his head. The people are also generally clad in the same manner, and are perpetually chewing the areca, or betle nut, like the Indians of the East, whose manners they greatly resemble. S. lat. 12° 30'. E. long. 43° 50'.

MOHILL, a post-town of the county of Leitrim, Ireland; 78 miles W.N.W. from Dublin.

MOHILNA, a town of Poland, in Volhynia; 44 miles N. of Zytomiers.

MOHILOW, a town of Poland, in the palatinate of Braclaw; 60 miles S.W. of Braclaw.

MOHN, called by the Esthenians "Muhoma," which literally signifies the land of boils or sores, an island of the Baltic, separated from the main land by a strait, called the Great Sound, about two Swedish miles over in its broadest part, and near a mile where it is narrowest; the transport being made in summer by large boats, called Prames. Boats of a similar kind pass between Mohn and Oesfel, across the Little Sound, which bears some resemblance to a spacious haven. Mohn lies to the S.W. of Oesfel, forming a parish of itself, with its own church and preacher. Near the middle of the island, on an eminence, stands the church. Many of the boors live here comfortably; and having a little portion of forest, which, and also their hay fields, are inclosed by a wall of stones. As a shelter from storms, to which these seas are subject, some have their houses built in the midst of these little thickets. Not only acorns and bilberries, but also wild nuts and crab apples grow here, of which last the boors make a tolerably well tasted cyder; and in the farms they use them also for swine-wash. The circumference of the whole island measures about 95 versts. The passage over the Great Sound in summer is made with oars in about four hours, but with a sail and fair wind in less than two. To Mohn belong two small islands; one lying towards the N., and quite uninhabited, is merely a hay-field for the boors of Mohn; the other lies nearly between Oesfel and Mohn in the Little Sound, and is occupied by three boors. On Mohn is a large stagnant lake, from which a canal has been made into the sea. Tooke's Russ. Emp. vol. i.

MOHO, a town of Peru, in the diocese of La Paz; 25 miles S.E. of Afungaro.

MOHR, a town of Germany, in the county of Hoya; five miles W. of Hoya.

MOHRAU, a town of Silesia, in the principality of Neisse, near a river of the same name; 28 miles S. of Neisse.

MOHRIA, in *Botany*, a curious genus of ferns, named by Dr. Swartz after his friend Dr. D. M. H. Mohr, of Kiel, the coadjutor of professor Weber, in several excellent botanical publications, particularly respecting the class *Cryptogamia*. In these he has displayed great knowledge and application, though not without some inaccuracy, and rudeness, rather than acrimony, of criticism. Experience, and a naturally good disposition, would gradually have overcome such defects, while his scientific abilities would have rendered the most extensive services to botany, had not an early death disappointed the hopes of his friends.—Swartz. Syn. Fil. 6. 159.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*. Linn. Juss.

Gen. Ch. *Capsules* sessile, distinct, roundish, depressed, concentrically striated, of one cell, bursting by a longitudinal fissure at one side, without any separate ring, situated near the margin of the frond. *Seeds* numerous, roundish, minute. *Involucrum* from the crenate inflexed margin of the lobes.

Ess. Ch. *Capsules* near the margin of the frond, distinct, sessile, concentrically striated, without a ring, bursting longitudinally. *Involucrum* from the crenate inflexed margin.

1. *M. thurifraga*. Incense-fern. Swartz. Syn. Fil. 159. 385. t. 5. (*Polypodium cafferorum*; Linn. Mant. 307. *Adiantum cafferorum*; 447. *Osmunda marginalis*; Lamarck Dict. v. 4. 655. *O. thurifera*; Swartz in Schrad. Journ. for 1800. 105. *Filicula aethiopica*, denticulatis pinnulis, averfa parte, Asplenii ritu, villosa lanugine tectis, pediculo splendente nigro; Pluk. Mant. 77. t. 150. f. 3.)—Gathered by Koenig at the Cape of Good Hope; by Sonnerat, as well as Commerfon, in the isle of Bourbon. The roots consist of many long, branched, blackish, hairy fibres. *Fronde* in dense tufts, near a span high, bipinnate, densely clothed beneath with imbricated, taper-pointed scales, as are also the stalks in some degree. *Leaflets* of the barren fronds roundish or ovate, sharply pinnatifid; those of the fertile fronds, which are considerably taller, ovate, obtuse, deeply and bluntly lobed, their edges, or terminations of the lobes, inflexed over the capsules, which are each the size of the smallest pin's head, ranged in a simple row, at a little distance from the margin of the leaflet. There are generally two capsules under each segment of the leaflet.

The smell of the recent fern is said to resemble that of incense, or gum benzoin: hence the French in the isle of Bourbon term it *la feuille d'encens*.

We cannot trace the error of Dr. Swartz's citation of Lamarck. His misquotation of Plukenet could not, on account of the confused arrangement of this author's book, be, without great care, avoided; but we trust our correction is right.—This genus differs from *Osmunda* in the structure as well as situation of its capsules, and is unquestionably very distinct from that and all others.

MOHRIN, in *Geography*, a town of Brandenburg, in the New Mark; 20 miles N. of Custrin. N. lat. 52° 54'. E. long. 14° 31'.

MOHRUNGEN, a town of Prussia, in the province of Oberland, situated on a lake of the same name, which almost surrounds it; 55 miles S.S.W. of Königsberg. N. lat. 53° 31'. E. long. 19° 51'.

MOHUN, a town of Hindoostan, in the circle of Kitchwara; 10 miles S. of Budawar.—Also, a town of Hindoostan, in Oude; 16 miles N.E. of Cawnpour.

MOHUNGUR, a town of Hindoostan, in the circle of Gohud; 18 miles S.W. of Narwa.

MOHUR, in *Commerce*, a coin in the East Indies. Gold mohurs, sometimes called gold rupees, are struck at the mint of Calcutta, as well as Sica rupees, called silver rupees; 16 of the latter are, by regulation, to pass for one of the former. The value of the gold mohurs has undergone considerable variations at different periods. At present the weight of the mohur is 13.28 massa, or 190,894 grains, and its fineness $23\frac{2}{3}$ carats, containing 189,462 grains of fine gold; and it is, therefore, worth 1*l.* 13*s.* 6½*d.* sterling. At Madras, the mohurs, or gold rupees of Bengal, occasionally pass for four star pagodas. (See PAGODA.) At Bombay, the gold mohur passes in account for 15 rupees. In 1774 the coin, called the gold mohur, or gold rupee, was ordered to be made of the same weight as the silver rupee, and to be equal in fineness to a Venetian sequin; so that the proportion of gold to silver in the Bombay coins was nearly as 15 to 1. Afterwards this proportion ceased; and gold, coined according to the regulation of 1774, exchanged for only 13 times its weight of silver. Accordingly, in order to remedy this, it was settled in 1800, that the mohur should be of the same weight and fineness as the silver rupee; and that it should pass for 15 such rupees.

The following TABLE shews the Assay, Weight, Contents, and Value of the East Indian Mohurs.

	Assay.		Weight.			Contents in pure Gold.	Value in Sterling.		
	car.	gr.	oz.	dwt.	gr.		Grains.	£	s.
Mohur, or gold rupee of Shah Allum, 1770	1	2½	0	7	22¼	186.8	1	13	0¾
Mohur of the same, 1787	1	2¾	0	7	23	188.5	1	13	4½
Half mohur of the same, 1787	1	2½	0	3	23½	94.	0	16	7½
Quarter mohur of the same, 1787	1	2½	0	1	23¾	47.	0	8	3¾
Sicca gold mohur of Bengal, dated 19th June, 1789	1	3½	0	7	23	189.7	1	13	7.
Old Bombay mohur still in circulation	0	3½	0	7	10½	170.	1	10	1
Surat mohur, of the latest coinage	0	0½	0	7	11	165.	1	9	2½
Tippoo's gold rupee	1	2	0	8	20½	181.5	1	12	1¾
Mohur, of the Dutch E. I. Company, 1783	3	3¼	0	10	2	181.5	1	12	1¾
Ditto	4	1	0	9	20	174.5	1	10	10½
Half ditto	3	1¼	0	5	3½	90.2	0	17	0¾

MOHURBUNGE, a province of Hindoostan, S.W. of Bengal.

MOIYLNA, a town of Lithuania, in the palatinate of Minsk; 36 miles S.W. of Minsk.

MOLA, a town of Naples, in Principato Citra; 18 miles S.S.W. of Cangiuro.

MOJABRA, a town of Africa, in Tripoli; 10 miles E. of Augela.

MOJAN, an island in the Baltic, belonging to Sweden. N. lat. 39° 22'. E. long. 18° 45'.

MOJARA, a town of South America, in the province of Tucuman; 18 miles N. of St. Salvador de Jugui.

MOIDENA, a town of Bengal; 20 miles S. of Kishnagar.

MOIDORE, MOEDA, or *Lisbonnia*, in *Commerce*, an old gold coin, struck and formerly current in Portugal.

The moidore and its divisions are reckoned by the *rees*, which see.

The gold pieces coined in Portugal before the year 1722, are now, on account of the signorage and the rise in the price of gold, 20 *per cent.* higher than their original value: thus, the old *dobras*, coined at 20,000 *rees*, are worth 24,000: the *Lisbonnines* or *moidores*, coined at 4000 *rees*, are worth 4800; and the halves and quarters in proportion; but few of these coins are now in circulation. The gold coins struck since 1722, are the *dobra*, of 12,800 *rees*; the *meia dobra*, *Joaneſe*, or Portugal piece, of 6400 *rees*; the half *Joaneſe* of 3200; the *dezeſeis teitooos*, of 1600; the *quartinho*, of 1200; the *oito teitooos*, of 800; the old *crufado*, of 400, now very scarce, and the new *crufado*, of 480 *rees*.

The Assay, &c. of Portugal Coins, will appear in the following TABLE.

	Assay.		Weight.		Contents in pure Gold.	Value in Sterling.			
	car.	gr.	oz.	dat. gr.		Grains.	£	s.	d.
Dobraon of 24000 rees - - - -	Standard		1	14	12	759.	6	15	0
Meio dobraon of 12,000 rees - - - -	Ditto		0	17	6	379.5	3	7	6
Dobra of 12,800 rees - - - -	Ditto		0	18	6	401.5	3	11	0 ¹ / ₂
Joaneſe of 6400 rees - - - -	o o ¹ / ₂		0	9	6 ¹ / ₂	203.	1	15	11 ¹ / ₂
Half Joaneſe of 3200 rees - - - -	o o ¹ / ₄		0	4	15	101.5	0	17	11 ³ / ₄
Moidore, or Lisbonnia (1/2, &c. in proportion)	Standard		0	6	22	152.2	1	6	11 ¹ / ₄
Piece of 16 teitooos, or 1600 rees - - - -	o o ³ / ₁₆		0	2	6	49.3	0	8	8 ¹ / ₄
Piece of 12 teitooos, or 1200 rees - - - -	o o ³ / ₈		0	1	16 ¹ / ₂	36.7	0	6	6
Piece of 8 teitooos - - - -	o o ³ / ₄		0	1	4 ¹ / ₂	25.9	0	4	7
Old crufade of 400 rees - - - -	o o ¹ / ₂		0	0	15	13.6	0	2	5
New crufade of 480 rees - - - -	o o ³ / ₈		0	0	16 ¹ / ₂	14.7	0	2	7
Milrea, coined for the African colonies, 1755	Standard		0	0	19 ¹ / ₂	18.1	0	3	2 ¹ / ₂

The impressions on the gold coins of Portugal are as follows:

The *dobraon*: arms of Portugal, with 20,000 on one side, and five flowers on the other: legend, JOANNES V. D. G. PORT. ET ALG. REX. (John V. by the grace of God king of Portugal and Algarves): reverse a cross, with four M's in the four angles; legend, IN HOC SIGNO VINCES, (by this sign thou shalt conquer). The half *dobraon* bears the same impressions, except that it is marked 10,000.

The *moidore* bears the same impressions as the *dobraon*, except that it is marked 4000, and has four B's in the four angles of the cross; but some of an ancient date bear on the reverse a cross, surrounded by four connected semi-circles, and a whole circle, with the legend ET BRASILIÆ DOMINUS ANNO, &c. (and lord of Brazil, in the year, &c.) The half and quarter *moidores* are marked 2000 and 1000; their impressions are in other respects the same as on the *moidore*.

The *Joaneſe*: head of the reigning sovereign, with name and titles; thus JOANNES V. D. G. PORT. ET ALG. REX; or MARIA I. D. G. PORT. ET ALG. REGINA, (Mary I. queen of Portugal and Algarves); and the pieces coined by the prince regent, since 1804, bear his head, with JOANNES B. G. PORT. ET ALG. P. REGENS (John, prince regent, &c.): reverse, arms of Portugal. The *dobra* or double *Joaneſe*, the half, quarter, and eighth *Joaneſe*, all bear the same impressions.

The *quartinho*: arms of Portugal, with 100, and the

legend, MARIA, D. G. &c.: reverse, a cross, with four flowers, and the legend IN HOC SIGNO VINCES, as before.

The old *crufade*: head of the reigning king; reverse, a crown; legend, JOAN, V. D. G. P. REX, as before.

The new *crufade*: name of the reigning sovereign, over it a crown; and under the name two palms, with 400 at the bottom; reverse the cross and legend, as in the *quartinho*.

The *milrea*: coined for the African colonies,—arms of Portugal, with 1000 on the side, and the name and title as above: reverse, a cross and circles as in the old *moidores*; legend, ET DOMINUS AF. OR. ANNO, &c. that is, "Dominus Africae orientalis" (lord of eastern Africa). Kelly's Un. Cambist.

MOIETY, MEDIETAS, the half of any thing.

MOIGOLSCHAR, in *Geography*, a cape of Russia, on the N.W. coast of Nova Zembla. N. lat. 72° 40'. E. long. 52° 14'.

MOIKA, a river of Russia, which runs from the right of the Fontanka, not far below its departure from the Neva, and runs almost parallel with it, into which it falls to the left of the Great Neva, close above its mouth.

MOILON, is a name given by the French to a kind of stone, that forms the upper crust, and lies round the free stone in most quarries. It is an excellent substance for forming the body of fluxes or soft enamel.

MOIMENTA DE BEIRA, in *Geography*, a town of Portugal, in the province of Beira; 13 miles S.W. of Castel Rodrigo.

MOINE, PETER LE, in *Biography*, was born at Chaumont, in Bassigny, in 1602. He entered into the society of the Jesuits at seventeen, and continued to serve it by his labours and writings till his death, at Paris, in 1671. The principal work for which he is famous as a poet, is "Saint Louis, ou la Couronne reconquise sur les Infidelles," in eighteen books, which, for a time, stood high among the epic poems in the French language. It is said to display a vigorous imagination, and considerable powers of poetical expression. Boileau, being called upon for an opinion of Le Moine, said, "he had too much extravagance for his praise, and too much poetry for his censure." He was a considerable writer in prose, in which his style and manner resemble those of verse. His "Peintures Morales;" "Traité de l'Histoire;" "La Galerie des Femmes fortes," have a considerable merit. Moreri.

MOINE, STEPHEN LE, a very learned French Protestant divine in the 17th century, was born at Caen, in Normandy, in the year 1624. Having laid in a good stock of elementary learning at his native place, he was sent to Sedan, where he went through a course of divinity under the celebrated Du Moulin. From thence he went to Leyden to study the Oriental languages. Upon his return to France in 1650, he was appointed pastor to the church of Gefosse. He afterwards removed to Rouen, where his zeal in maintaining Protestant principles exposed him to the persecution of the Catholics. In 1676 he left France, came over to England, and was honoured with the degree of doctor by the university of Oxford. From hence he passed over to Holland, and obtained the professorship of divinity at Leyden, which he occupied with much reputation during the rest of his life. In the year 1685, he published a collection of curious Greek treatises, relating to ecclesiastical history, preceded by long *prolegomena*; it was entitled "Varia Sacra, seu Sylloge variorum Opusculorum Græcorum ad rem ecclesiasticam spectantium." He was author of many other curious and learned works. He died in 1689, in the 65th year of his age. Moreri.

MOINE, JOHN LE, a French cardinal, who flourished in the 13th and 14th centuries, and founded a college at Paris called after his name, was a native of Cressy, in Ponthieu. He was educated at the university of Paris, where he studied divinity and the canon law, and was admitted to the degree of doctor. After various promotions in the church, he was raised to the purple, either by pope Celestine, or by Boniface VIII. By the last mentioned pontiff he was held in high esteem, and appointed his legate in France, at the time of his contest with Philip the Fair. In this business the cardinal was ready to sacrifice the interests of the sovereign and of his country, that he might gratify the ambition of the court of Rome. He died at Avignon, in 1313. He was author of "A Commentary on the sixth Book of the Decretals," which is said to display the knowledge and abilities of an able and profound canonist. It was printed at Paris in 1536, and at Venice in 1586. Moreri.

MOINE, ABRAHAM LE, a French Protestant divine, who was born towards the close of the 17th century, and became a refugee in England on account of his religion. He officiated as minister to a French church at London, and died in the year 1760. He is known chiefly by "A Treatise on Miracles," which was written in answer to Chubb, and which, on many accounts, was thought well of by the late learned Mr. Hugh Farmer. Subjoined to the treatise on miracles is a postscript, intended to vindicate the authority of the ancient fathers, in answer to what had been advanced by Dr. Middleton in his "Free Enquiry." Le Moine published also "A Sermon in Defence of Sacred History,

in Answer to Lord Bolingbroke," and some other sermons. He also translated into the French language bishop Gibbon's "Pastoral Letters;" "The Trial of the Witnesses of the Resurrection of Jesus;" and "Discourses on the Use and Intent of Prophecy," by bishop Sherlock. These translations are accompanied with curious and interesting dissertations, by the translator. Gen. Biog.

MOINE, in *Geography*, a river of Louisiana, which runs from the N.W. into the Mississippi, in N. lat. 40° 5'. W. long. 91° 54'.

MOINE, La, a bay on the S. coast of Newfoundland; 25 miles E. of Cape Ray.

MOINEAU, in *Fortification*, is a flat bastion, raised before a curtain when it is too long, and the bastions of the angles too remote to be able to defend one another.

Sometimes the moineau is joined to the curtain, and sometimes it is divided from it by a moat. Here musqueteers are placed, to fire each way.

MOINHO DIEGO, in *Geography*, a town of Portugal, in Estramadura; 30 miles N.E. of Lisbon.

MOJOS, a town of South America, and capital of a province, in the viceroyalty of Buenos Ayres; 14 miles N. of St. Salvador de Jujui.

MOIRA, a post-town of the county of Down, Ireland, chiefly inhabited by persons concerned in the linen manufacture, for which the neighbouring country is peculiarly favourable. White lime-stone is abundant in the neighbourhood. Moira gives the title of earl to the Rawdon family. It is 69 miles N. from Dublin.

MOIRA'S Strait, an inlet on the E. coast of the Prince of Wales's Archipelago, in the duke of Clarence's strait. N. lat. of the entrance 54° 58'. E. long. 228° 22'.

MOIRANS, a town of France, in the department of the Jura, and chief place of a canton, in the district of St. Claude. The place contains 1190, and the canton 6855 inhabitants, on a territory of 195 kilometres, in 30 communes.

MOIRE, in *Conchology*, the mohair shell, a name given by the French virtuosi to a peculiar species of *voluta*, which seems of a closely and finely reticulated texture; and resembles on the surface a piece of mohair, or a very close silk-worm's web.

MOISDON LA RIVIERE, in *Geography*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Chateau-Briant; six miles S. of it. The place contains 1505, and the canton 4958 inhabitants, on a territory of 257½ kilometres, in 5 communes.

MOISIE, a river of Lower Canada, on the N. shore of the St. Lawrence, a little E. of the Seven Islands: it runs into the latter river in N. lat 50° 15'. W. long. 65° 40'.

MOISSAC, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban, situated on the Tarn, near its confluence with the Garonne; 13 miles N.W. of Montauban. The place contains 10,035, and the canton 14,008 inhabitants, on a territory of 162½ kilometres, in six communes. N. lat. 44° 6'. E. long. 1° 10'.

MOISTURE. See HUMIDITY and HYGROMETRY.

The instrument used for determining the degree of moisture in the air is called an hygrometer. Under the article HYGROMETRY, we forgot to introduce an account of a new hygrometer, with which the editor was some years ago favoured by Mr. Coventry, of Southwark, the construction of which is as follows: take two sheets of fine tissue paper, such as is used by hatters and watch makers, and sometimes called lawn-paper, each sheet of which generally weighs about twenty-seven grains. Let the moisture be thoroughly evaporated

evaporated by the fire, without scorching the paper; till after repeated trials it is brought to its driest state: in this state cut each sheet till it weighs exactly twenty-five grains. These sheets, thus prepared, should be kept in a box or drawer, with a quantity of the same paper designed for use; and they will always serve for determining the proper weight of any quantity of paper for other hygrometers. This paper hung in any place, and kept free from dust, and weighed with a nice pair of scales, will serve to exhibit the moisture of the air, by its increase of weight above fifty grains. But to avoid the trouble of weighing, Mr. Coventry prepared an hygrometer of it in the following manner. A (Plate XIV., *Hydraulics*, fig. 2.) represents a pillar supporting the beam B B, to one end of which are suspended fifty grains of paper D, cut round, and threaded on a silk string, with a small glass head between the sheets, for the freer admission of the air: at the other end of the beam is a brass weight E, to counter-balance the weight of the paper and its appendages. At the bottom there is an ivory scale F F, of twelve prime divisions, answering to twelve grains of moisture: each prime division is subdivided into ten parts, making in the whole 120 divisions: on the index C is a sliding weight G, which, with the weight E on the beam, serves to adjust the instrument; so that twelve grains shall make the index just traverse the scale of the twelve divisions. If the air was so dry as to leave no moisture in the paper, the index would then point to 0: if it contained six grains of moisture, the index would point to sixty; if twelve grains were in the paper, it would point to the moist extreme, one hundred and twenty: but the air has never yet been observed so moist, as to make the index point to the moist extreme, nor so dry as to allow its reaching to the driest extreme, even in the hottest part of summer, by nearly twenty divisions: whence it is inferred that there is in the air a greater quantity of moisture in hot weather than is generally imagined. H is an adjusting screw for fixing the stand upright by means of the point of a plummet that hangs behind. This hygrometer, adjusted, may be made to correspond with another, ascertained to the same weight at any distance: by which we might determine the exact difference of the state of the air, with respect to moisture, in inland, and places near the sea-side. The advantages of this hygrometer are the following: as it is made of the thinnest substance that can be procured, it is the soonest affected with dryness or moisture, and exhibits immediately the first change of the weather: it is not acted upon by heat or cold, or any other cause, as most other instruments of this kind are; it has one datum from which to reckon, *viz.* the dry extreme, whence all other degrees of moisture may be nicely estimated. All hygrometers of this sort will act nearly alike, as thermometers or barometers; and may be reduced to a regular standard. Mr. Coventry found by this hygrometer, that in clear frosty weather, the air contains a very considerable degree of moisture: for on Jan. 27, 1776, in the morning, being a very hard frost, the thermometer in the house 24°, and in the open air 17°, the hygrometer stood at ten grains, *i. e.* at the division 100: and on the next morning, when a thaw came on, it stood at 96; which shews that there is as much moisture in the air during the frost, as when we perceive it dissolved in a thaw. He adds, that it is pleasing to observe the constant motion of this hygrometer: for even in constant settled weather, it is always in motion, from moist towards dry, from about eight in the morning till about four in the afternoon: and from dry to moist, from about 4 P.M. to about 8 A.M. In hot gloomy weather, the hygrometer is mostly found to advance with speed towards moist, and shews that the air at such times retains a great

quantity of moisture: and this always forebodes heavy showers. For curious experiments some of these hygrometers are made to traverse the whole scale of division for every grain of moisture that is imbibed by the papers.

MOISTURE, *Radical*. See RADICAL.

MOITTORET, DE BLAINVILLE, ANTHONY, in *Biography*, a French architect and geometrician, was born at a village four leagues from Dijon, in the year 1650. His genius led him to the study of geometry and architecture, in which he became an expert proficient, and settled in business at Rouen. Here he acquired considerable reputation by his skill as an artist, and by his useful and popular elementary writings. He was appointed surveyor and gauger-royal of Rouen, under which office the public breweries of that city were included by a commission from the king. He died at Rouen in 1710, when he was about sixty years of age: he was author of "A Treatise on Gauging, with Instructions for measuring Mason's Work, &c." which went through several editions during the author's life, and after his death it was republished with improvements at Rouen, in 1714, under the care of M. Hacquet, with the title of "Blainville's New Elements of Geometry." He also published "A Treatise on the extensive Commerce of France, for the Information of Tradefmen," which was reprinted after his death, in 1728, with considerable additions, in two volumes: he is author, likewise, of abridgments "On the Art of Levelling;" "On Spherics," &c. which were favourably received by the public, and became very popular.

MOIVRE, ABRAHAM DE. See DE MOIVRE.

MOKA, in *Geography*, a town of Hindoostan, in Golconda; 28 miles S. of Adoni.

MOKAMO, a town of Hindoostan, in Bahar; 40 miles N.E. of Rangur.

MOKATTAM, a mountain of Egypt, near Cairo; which see.

MOKEIA IBN AMER, a town of Arabia, in the province of Yemen; 22 miles N.N.E. of Chamir.

MOKERAMPOUR, a town of Bengal, 12 miles from Midnapour.

MOKESSET, a town of the Arabian Irak, on the Tigris; 116 miles N.W. of Bassora.

MOKEYA, a name given by the Arabs to those coffee-houses which stand in the open country, and are intended, like our inns, for the accommodation of travellers. They are mere huts, and are scarcely furnished with a "ferir," or long leat of straw ropes; nor do they afford any refreshment but "kischer," a hot infusion of coffee-beans. This drink is served out in coarse earthen cups; but persons of distinction always carry porcelain cups in their baggage. Fresh water is distributed *gratis*. The master of the coffee-house lives commonly in some neighbouring village, whence he comes every day to wait for passengers. We may here observe that a "mansale" is a house in which travellers are received and entertained *gratis*, if they content themselves with such treatment as is usual in the country; they are all lodged in a common apartment, which is furnished with a "ferir," and are served with "kischer," hot millet bread, camels' milk, and butter. Niebuhr.

MOKLAFF, in *Geography*, a town of Arabia, in the province of Yemen, the residence of a sbeick; 30 miles S.E. of Loheia.

MOKLIA, or MUCHLI, a town of European Turkey, in the Morea; 16 miles S.S.W. of Argos.

MOKNAN, or MOHANAN, a town of Egypt, on the W. side of the Nile, near which, according to Dr. Pocock and M. d'Anville, was the site of the ancient Memphis; 5 miles S. of Gizeh. See MEMPHIS.

MOKO,

MOKO, a town and district of Africa, in the country of Calabar.

MOKOKF, in *Botany*, Kämpf. Amœn. 873. t. 774, a Japanese tree, with very fragrant but short-lived blossoms, the *Cleyera japonica* of Thunb. Jap. 224. This proves of the same genus with the Linnæan *Ternstroemia*, and the *Taoniabo* of Aublet. (See *TERNSTROEMIA*.) Some discordance between the descriptions of Kämpfer and Thunberg, which puzzled Jussieu, arose from a degree of inaccuracy in Thunberg's description of the corolla, which is really monopetalous, like that of *Camellia*.

MOKOMOE, in *Geography*, a town of Bengal; 37 miles N.E. of Ramgur.

MOKONTPOUR, a town of Hindoostan, in Oude; 14 miles S. of Canouge.

MOKRETZ, a town of European Turkey, in Bulgaria; 44 miles S.S.E. of Viddin.

MOKSCHAK, a town of Russia, in the government of Penza, near the source of the river Mokschia; 36 miles W.N.W. of Penza. N. lat. 58° 40'. E. long. 44° 50'.

MOKUI, a town of Mingrelia; 20 miles N.E. of Isgaur.

MOL, Fr. an epithet which Aristoxenus and Ptolemy give to a kind of diatonic genus, and a species of the chromatic. See *GENUS*.

For modern music the word *mol* is only used in compositions where B♭ occurs, or B*mol*, in opposition to B*quarre*, or B*quadro*, which formerly was called B*dur*, or B*durum*. Zarlino, however, calls the diatonic mol a kind of diatonic genus. See *DIATONIC*.

MOLA, PIETRO FRANCESCO, in *Biography*, was a celebrated painter, born at Lugano in 1609. He was a disciple of Cesari d'Arpino, but did not follow the principles of that master long, having too good a taste not to improve by an abode which he enjoyed for some time at Venice, where he carefully studied the works of Titian. Mola possessed considerable skill in historical painting; but his forte lay in landscape; the heroic style of which he fought from Titian; but, like him, he often weakened the interest of his pictures by the introduction of figures upon so considerable a scale as to excite a doubt which is principal, the actors or the scene. His peculiar excellence lay in the richness of his colour and the freedom and fulness of his touch; together with the grandeur of composition which he exhibited in his landscapes, frequently not unworthy of Titian himself. There is a picture by him in the gallery of the Louvre in Paris, which for sublimity almost vies with the St. Peter Martyr; and for colour, is quite equal to it. The subject of this picture is St. Bruno's Vision in the Desert.

The genuine pictures of this master are rarely to be met with in this country, though there is plenty of those which bear his name, and perhaps were executed by his brother Giovanni Battista Mola; whose works bear more resemblance to Albani than those of Francesco. He died in 1665, at the age of 56.

MOLA, or *Mola di Gæta*, in *Geography*, a town of Naples, in the province of Lavora, situated near the sea. It has a custom-house and a garrison, which is relieved every week from Gæta. It was anciently a Roman colony, but after the defeat of the Samnites it became a prefecture, and thus continued till it was ranked among the military colonies of Italy by the triumvirs Octavius, Antonius, and Lepidus. Under the emperors it became considerable; but it was at length ransacked and destroyed by the Saracens in 956, and its bishopric transferred to Gæta. It is situated on the ancient Appian way; and it was from this place that Cicero endeavoured to make his escape into Greece. (See *CICERO*.)

The city of Formiæ stood on or near this spot. Between Mola and Gæta the road is rendered agreeable by the number of orange-trees which are planted in the adjoining fields; three miles N.E. of Gæta. N. lat. 41° 18'. E. long. 13° 29'.

MOLA di Bari, a town of Naples, in the province of Bari, on the coast of the Adriatic; 20 miles E. of Bari.

MOLA, in *Physiology*. See *MOLE*.

MOLA, in *Ichthyology*, a species of *Tetrodon*; which see. — Also, a species of *Diodon*; which see.

MOLA, in *Anatomy*, a bone of the knee, called also *patella*, *rotula*, &c.

MOLANAGUR, in *Geography*, a town of Hindoostan, in Bahar; 21 miles E.S.E. of Saferam. N. lat. 24° 50'. E. long. 84° 32'.

MOLANDS, a town of Norway; 12 miles N.N.E. of Christiansand.

MOLANUS, JOHN, in *Biography*, was born at Lisse, in Flanders, in the year 1533. As his parents were originally of Louvain, whither they returned with him while he was very young, and also on account of his having spent the greatest part of his life in this city, the surname of *Louvainensis* is generally given to him. He was educated at Louvain, where, having sedulously applied himself to the study of divinity, he was admitted in the year 1570 to the degree of doctor of divinity, and for some years filled the chair of professor of that faculty with great reputation. He was nominated censor of books by the pope and the king of Spain, as well as canon of the church of St. Peter at Louvain. He died in 1585, at the age of fifty-two. He was author of a great number of works which were in high estimation at the time when they were written, but are now scarcely ever enquired for. He was concerned, with other members of the university, in publishing the Antwerp edition of the works of St. Augustine in the year 1577, and the notes at the end of the Latin bible of the divines of Louvain, published also at Antwerp in 1580. Moreri.

MOLANUS, GERARD-WALTER, a Lutheran divine and professor in the seventeenth and eighteenth centuries, was born at Hamelen, in the duchy of Brunswick-Lüneberg, in the year 1633. In 1660, he was elected professor of mathematics, and in 1672 he became professor of divinity in the *Gymnasium* of Rintelen, in the duchy of Schaumburg. He obtained other instances of preferment, and took precedence in the states of Calenberg, and was president of the consistory of Hanover. He died in 1722, at the age of eighty-nine. He had collected a valuable cabinet of medals, and an excellent library, of which he made a good use. As an author his most important work was published first in the German language, in the year 1697, and afterwards repeatedly reprinted in Latin, under the title of "*Lipfanographia, seu Thesaurus Reliquiarum Electoralis Brunsvico-Luneburgicus*." He was author also of "*Epistola ad Dominum Joachimum Meyerum quâ exponit cogitationes suas de numero aureo Posthumi ab eo edito. &c.*" Moreri.

MOLAPARA, in *Geography*, a town of Bengal; 30 miles W. of Dacca.

MOLARES, in *Anatomy*, the grinding teeth. In the old arrangement, the five posterior teeth on each side of the jaw are so called. At present the two front and smaller of these are called bicuspides, and the term molares is applied exclusively to the three posterior ones. See the description of the teeth in the article *CRANIUM*.

MOLARIS Glandula, one of the mucous glands of the mouth, placed near the back grinding teeth.

MOLARES, in the *Natural History of the Ancients*, the name for

for the compound mineral bodies we now call pyrites, and marcasites.

MOLASSES. See **MOLASSES.**

MOLBEITZKOL, in *Geography*, a town of Russia, in the government of Novgorod; 24 mile S.E. of Tichvin.

MOLCHINA, a town of Russia, in the government of Tobolsk; 60 miles S.E. of Narim.

MOLCZAR, a town of Lithuania, in the palatinate of Novogrodek; 16 miles S. of Novogrodek.

MOLD, or **MOULD,** a market-town in the hundred of Mold, Flintshire, North Wales, is pleasantly situated in a small but fertile plain, surrounded by lofty and rugged hills. It consists chiefly of one long and very spacious street, and, according to the parliamentary returns of 1801, contains a population of 4235 persons. The market is held on Saturday every week, and there are four fairs during the year. The assizes for the county of Flint are holden in this town. On the north side of it rises a large mount called Bally-hill, said to be partly natural and partly artificial, the summit of which was formerly crowned by a Norman castle, probably erected by Eulace de Cruer in the reign of William Rufus. This fortress seems to have been a place of great strength, as the sides of the mount are not only very arduous of ascent, but are defended by a deep foss and ramparts. History records that it stood several sieges without being compelled to surrender, till at last it was stormed by the Welsh forces under the command of prince Owen Gwynedd, in the time of Henry I. Subsequent to this period it suffered many vicissitudes, and was completely demolished during the desperate contests maintained against England by the celebrated Owen Glyndwr. Wynne, in his History of Wales, informs us, however, that it was soon rebuilt, and thereafter once more levelled with the ground by Griffith a Gwynwyn, about the year 1267, since which time it does not appear to have been restored. The view from the scite of this castle, though circumscribed, is extremely beautiful. The church here is a very handsome edifice in the pointed style, consisting of a nave and two side aisles, with a tower at the west end. In the interior are several monuments. The living is a vicarage in the patronage of the bishop of St. Asaph. A considerable cotton-thread manufactory is carried on here. The vicinity of Mold is decorated by several mansions, some of ancient and some of modern erection, the seats of independent gentlemen, who generally reside on their estates. Of these the most conspicuous are Leeswood, Tower, Rhual, and Nerquis-hall. Immediately adjoining to Rhual is Maes-y-Garmon, or the field of Germanus, so called from its having been the scene of a most decisive victory achieved by the British Christians under the missionary bishops, Germanus and Lupus, over the Pagan Picts and Scots, in the year 448. A pyramidal stone, erected on the spot in 1736, by Nathaniel Griffith, the then proprietor of Rhual, bears a Latin inscription commemorative of the event. The hills which inclose the vale in which Mold is situated abound with rich lead mines some of which are wrought with signal advantage both to the proprietors and contractors. On Moel-y-Famma, the highest point of these hills, a monument has been lately erected by subscription, as a memorial of the event of our most gracious sovereign having reigned for the unusual period of fifty years. Beauties of England and Wales, vol. xvii. from Wynne's History of Wales.

MOLD. See **MOULD.**

MOLDAU, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 21 miles N.W. of Leitmeritz.

MOLDAVIA, a province of European Turkey, bounded N. and N.E. by Poland, from which it is separated by the

Dniester, E. by Bessarabia, S. by Walachia, and W. by Transylvania; situated at about 190 miles in its greatest length from N. to S., and somewhat less in breadth from E. to W. It is crossed from N. to S. by the river Pruth. Some lands in this province are very fertile, but a considerable part of the eastern division consists chiefly of deserts, and is uncultivated; and on the western side it is very mountainous. The Pruth and the Siret are its principal rivers. Its inhabitants are of Walachian extraction, and their religious profession is that of the Greek church; but they are intermixed by Mahometans, Russians, Poles, Rascians, and Armenians. About the close of the twelfth century a colony of Walachians from Transylvania settled in this country. They migrated under the conduct of a person named Bogdan, who established their government both civil and ecclesiastical; and who obtained, with a view to the latter, an archbishop and other ecclesiastics from the patriarch of Constantinople. As he was the first prince, and founded the chief towns, the country was denominated Bogdania. The prince or waywode of this province is styled hospodar, and is the vassal of the Ottoman Porte, to whom he pays a yearly tribute. Moldavia is divided into Upper and Lower. Upper Moldavia extends almost to Jassy, and its boundaries are the river Dneister on the E., on the N. that river and Poland, and on the W. Transylvania. Moldavia on the W. borders on the mountains of Transylvania; its southern boundary is the Danube; Bessarabia bounds it on the S.E., and on the E. it is bounded by the Dneister. Its capital is Jassy.

MOLDAVICA, in *Botany*, Tourn. Inst. 184. t. 85: Moldavian Balm. (See **DRACOCEPHALUM.**) Tournefort associates with it also the *Dracocephalum canariense* of Linnaeus.

MOLDAVITZA, in *Geography*, a town of European Turkey, in Moldavia; 40 miles W. of Suezava.

MOLE, THOMAS, in *Biography*, a learned English Protestant dissenting minister, of whom little is known but from his works. He is supposed to have received his academical education under Mr. Jones of Tewkesbury, by whom bishop Butler, and archbishop Secker, were also inducted into the knowledge of the sciences and theology. He was probably first settled as minister at Uxbridge, in Middlesex, in 1725, from which place he removed in 1728 to Rotherhithe; and about the year 1743, he quitted Rotherhithe for Hackney, where he lived some years, and then returned to Uxbridge, or its neighbourhood, to spend the remainder of his life. The latter part of his days he employed in writing, in the Latin language, a life of the celebrated Laurentius Valla, including the religious and literary history of his time: The MS. of this work was sold at a common auction with his other books, and has probably been long since consumed as waste paper. Mr. Mole died near Uxbridge about the year 1780, at a very advanced age. He was the author of several single sermons and tracts, that do much credit to his talents as a writer and controversialist. Dr. Kippis ranks him, in point of learning, with Lardner, Benfon, and Chandler; and Dr. Lardner has shewn his respect for Mr. Mole's critical skill, by incorporating with his own some very ingenious observations that he received from him, on the case of the demoniac who resided among the tombs on the coast of Gadara. Gen. Biog.

MOLE, in *Agriculture*, is a small well known subterraneous animal, which often does great mischief in the fields, by loosening the earth, raising hills, and destroying the roots of corn, grass, and other productions of the vegetable kind.

In respect to the natural history of the mole, as connected with

with the art of husbandry, it has been observed by M. Aurnagnac, that it lives under ground. Its health is liable to be injured by too free access of the air: yet that it sometimes leaves one subterraneous habitation and passes on the surface in search of a better. It lives on the roots of plants, on insects, and on worms. Hence it is commonly found in lands of soft fertile soil. It never fixes its abode in miry, nor in gravelly grounds. If surprised in its subterraneous recesses by water, it springs in great haste to the surface. And that in winter, and during rain, it betakes itself to the upper grounds, which are the least humid, and the least liable to be inundated. But in spring, the mole comes down from its winter residence to the meadows, where it finds a soft mould capable of being easily penetrated, and containing plenty of roots. And after suffering long drought, it flies to ditches, to the brink of the first stream, or to shelter under hedges. In the months of February, March, April, and May, the female produces its young; bringing commonly four or five at a birth. These animals prepare beforehand, for this occasion, an arched recess under ground in a situation somewhat elevated, and generally under cover of a bush or hedge. To the number of four or five mole-hills may be observed very near to the upper side of this recess. It cannot live without being at work. Being obliged to search under ground for its food, it forms there long tunnels or subterraneous passages, named in French *boyaux*. These tunnels are usually parallel to the surface of the earth, and vary in depth according to the changes of seasons, from four to six inches. And as the moles are almost equally afraid of cold and of heat, they make their passages the deepest, and work at the greatest distance under the surface, in summer and in winter. They are extremely timid when they perceive themselves to be in danger. They then penetrate by a perpendicular opening, to the depth of a foot and a half below the level of their ordinary residence. And in forming their passages they throw back the mould, which they remove towards the surface. It is thus the mole-hills are raised. Upon every new change of place a mole raises three, four, six, or even nine of these hills, according to its age. Consequently, all the mole-hills formed by any one mole, communicate by subterraneous passages with one another. When with any instrument, a tunnel or passage, recently formed by a mole is opened, the mole will, in a few minutes, come to close up the aperture, in order to secure herself from danger, and from the access of the external air. It constructs, for this purpose, over the aperture, an arch of loose mould, having, externally, the appearance of an oblong mole-hill, and mending up the tunnel much in the same manner in which a plumber might mend a leaden pipe, by clumsily applying, on the outside, a piece of lead to cover any hole in it. And should this new mole-hill likewise be broken down, the mole will again return to repair it. These two capital facts constitute the fundamental principles of the art of the mole-catcher. The mole works in all seasons; because it cannot otherwise have subsistence. That it sleeps, as some naturalists have affirmed, all winter, is not true. It is, however, languid in this season; working now much less than in summer. It is about the beginning of spring, that the mole sets to work with the greatest activity, and raises the greatest number of mole-hills. It is then obliged to find food for its young; as spring is its season for parturition. The ground is now more easily wrought than at other times. The animal, too, in itself becomes more vigorous, by the diminution of the cold, and the return of the genial temperature of spring. These are the causes of its increased activity in toil. The male is much stronger than the female, and raises a greater number

of mole-hills, and those larger. The female works less than the male, throws up fewer mole-hills, and those smaller. And the young moles form only long covered ways at the surface; the mould raised over which is scarcely sufficient to hide them. When they begin to make mole-hills, these are small, without any regular shape, and arranged zig-zag. The hours of working, for moles, are at sun-rise, at the hour of nine in the morning, at noon, at three in the afternoon, and at sun-set. But it is at sun-rise, and at sun-setting, that they ply their work with the greatest briskness. And in times of drought, they do not throw up mole-hills, except at sun-setting. In winter their moments of working are when the earth is somewhat heated by gleams of sun-shine. The sense of seeing is exceedingly obtuse in the moles; but its hearing is exquisitely delicate and acute.

MOLE-Catcher, a term applied to a person whose business is principally the catching and destruction of moles. See *MOLE*.

MOLE-Catching, the art of catching and clearing land of moles. It is stated in regard to the principles of destroying these animals, that it is difficult to take moles unless when they are at work. That the most favourable time for the mole-catcher is in the beginning of spring. And that it is in the meadows they should be, in this season, the most earnestly attacked. They are to be attacked at sun-rise, at the hour of nine in the morning, at noon, at three in the afternoon, or at sun-set. That it is better to commence an attack upon them at sun-rise, than at any other time in the day. And that the next most convenient hour is nine in the morning; because, if all the moles which are wished to be destroyed cannot be then taken, the operations may be renewed at those other hours in the day at which these animals are known to resume their work. In watching for a single mole, care must be taken to make no noise, and especially not to stamp nor beat upon the ground. One may, at any time, force a mole to come above ground, by pouring a sufficient quantity of water into its subterraneous recesses. And should a person happen to be near a mole-hill, when the mole happens to betray its presence by stirring the mould; let him then, with his hoe, break into the tunnelled passage between that and the next mole-hill; and let him, with a little earth, close up the passage at the aperture made with his hoe. The mole is now imprisoned between the mole-hill, and the place where its passage is broken into, and stopped up. If the earth of a mole-hill be freshed and newly raised, you may conclude that there is a mole within it. The same thing may be inferred of any number of fresh mole-hills within small distances of one another. Yet, however fresh the earth of any mole-hill, if there be in its centre a perpendicular hole of about two inches diameter; you may be sure that the mole is not within, but has left his residence in search of a better. And when you find an assemblage of mole-hills together, of which the earth is quite fresh; then, upon removing them all with the hoe, and laying open the passages communicating among them, you cannot fail to find the mole that works within. This labour might prove too tedious and troublesome. But it will become very simple, if the mole can be confined between two points not remote from each other. Nothing more will then remain to be done, but to open with the hoe the intermediate passage between these two points. And a mole may be reduced to confinement between two such points, by making a few slight openings in the length of the tunnelled passage, in which you desire to confine her. These openings interrupt her course; for she will not pass, till she shall have first repaired them. But when you break into the tunnelled passage of a mole, close the passage slightly

with

MOLE-CATCHING.

with a little loose earth at both ends of the hole you have made.

It may be noticed, that in the practice of mole-catching on these principles, "the only instrument absolutely necessary to the mole-catcher is a hoe. But that it will be convenient that he have likewise at hand, a few pieces of straw, a few bits of paper, and a picher of water.

And thus prepared, "the first thing a mole-catcher should do on a farm or estate which he goes to free from moles, is to examine how those moles may be so confined, that he shall be able to attack them all at once; for by thus attacking them, he will the soonest accomplish his whole task."

In the plate of *Agriculture (Moles)*, a representation is given of a meadow covered with mole-hills, as at *figs. 1, 2, 3, 4, 5, 6, 7*, which are taken from the work of a late French writer. And by surveying this meadow as a mole-catcher, he perceives a detached mole-hill, as *fig. 1*; and perceiving the earth composing it to be fresh, or newly thrown up, he concludes, then, that there is a mole beneath. The mole-hill is large; he thence knows the mole within it to be a male. And with respect to the two mole-hills, *fig. 2*, they are at no great distance one from another; of course he knows them to be the work of a single mole. They appear fresh; and he concludes the mole to be still busy within. They are small; he, on this account, supposes it to be a female that has made them.

And the three mole-hills, *fig. 3*, are near to one another; and, consequently, the work of a single mole. They are fresh; he of course knows the mole to be now at work within. They are large; and have therefore been thrown up by a male. The six mole-hills, *fig. 4*, are not distant from one another; they must have been all thrown up by one mole. They are fresh; the mole is still at work. They are small; and, therefore, raised by a female. The zig-zag covered ways, or imperfect mole-hills, as at *fig. 5*, are fresh; a young mole is beneath.

But the five mole-hills, as at *fig. 6*, are dry; they have been deserted. And the seven mole-hills at *fig. 7*, are yet fresh; but one of them, shown at *M*, has a perpendicular hole opening at the top. The mole by which it was thrown up is hence known to be but just gone. By these observations he knows that there are in this meadow two male moles, two females, and a young one. And it is of consequence to know whether the moles be males or females; young or old. The males work quicker than the females; and are, therefore, to be more narrowly watched. The young ones, raising but a very little mould to cover them, as they move along at the surface, go also very quick; and should therefore be kept constantly in view, after they have once been discovered.

It may be observed, that in the operations for destroying them in the first case, as where a mole makes but one mole-hill, *fig. 1*, the mole-catcher removes this mole-hill with the hoe; and ascertains whether it has communication with any of the mole-hills adjacent. For this last purpose, he hems, or makes a slight noise, at the aperture or mouth of the internal passage from the demolished mole-hill. He at the same time applies his ear to listen what ensues within. If the mole-hill be without any communication with any other; the mole being nigh is frightened by the noise; he hears it stir; and it cannot escape him. With his hoe he lays open the tunneled passage *ab*; and at *b* he finds the mole. But the creature, aware of its danger, may possibly have had time to descend deeper into the earth, by the perpendicular passage *bc*; he has then two methods for taking her; he either digs to *c*, and there finds his prey; or he pours in water at *b*, and the mole comes out of herself. On the

other hand, if upon hemming he could not hear her stir; he concludes that this mole-hill communicates with others near it; and he proceeds in the following manner.

This is the second case, as that where a mole has thrown up two mole-hills *A, B*, *fig. 2*, he now makes an opening *de*, more than nine inches long, in the direction of the tunnel which runs between the two mole-hills. With a little earth he closes the two ends *d, e*, of the tunnel. Within a few seconds, the mole, disagreeably affected by the air, and fearful of danger, comes to repair the breach, and is discovered by its working at *d*, or *e*. If it come to *d*, he knows that he shall find it between that point and the mole-hill *A*. And when it comes to *e*, he is sure of finding it between *e* and the mole-hill *B*. In either instance, he proceeds as was indicated in the first case; and lays open either that part of the tunnel which terminates at the mole-hill, or that which ends at *B*.

But in the third case, where the mole has thrown up three hillocks, *C, D, E*, *fig. 3*, he now makes the four apertures *f, g, h, i*. The mole will be soon discovered by its stirring the mould at *f*, at *g*, at *h*, or at *i*. If it work at *f*, it is confined between that point and the hillock *C*. If it be perceived to work at *i*, it is confined between the point *i*, and the hillock *E*. And if it work at *g*, or *h*, it is in the space between these two points.

And in these three suppositions, he operates as in the first case, by laying open that part of the passage within which the mole is confined. If the mole be shut up between *g* and *h*; and he does not choose to take the trouble of laying all that space open; he then removes the mole-hill *D*, and makes a third cut like the others. He watches for the working of the mole; and he then knows by the side this appears on, whether he shall find the animal between the third cut and the point *g*, or between that third cut and the point *h*.

Also in the fourth case, where a mole has made four or more mole-hills, *fig. 4*, he takes, for example, the six mole-hills *F, G, H, I, K, L*. He makes the cut *kl*. If the mole come to work at *k*, it is confined between that point and the mole-hill *F*. If, on the contrary, she come to *l*, she is confined between *l* and the mole-hill *L*. In either of these suppositions, he makes from *K* to *F*, or from *l* to *L*, the same means of operation as in the third case; that is, he proceeds just as if there were but three mole-hills.

But a different mode of operating in the second, third, and fourth cases, is this; he supposes, that when he has made the cut *de*, *fig. 2*, the mole comes to work at *d*, and he observes it the moment it comes there. He knows that it must travel along *de*, to repair the breach in its tunnel by an arch of earth, which it must raise from the bottom of the place laid open. If he remain there, without making a noise, he shall see it come to work. Then, to take this mole, he has only to put the end of his hoe behind it, before it comes to the point *e*. The earth which he had before put at the aperture, *d*, will hinder it to advance; the end of the hoe will prevent it from retiring; and he shall easily take it, by removing with his fingers that small portion of loose earth with which it is covered. Is it possible, even without an aperture, to know the moment a mole comes to work at it? Nothing more is, for this end, necessary, than to place there a chip of straw, bearing a bit of paper at its upper end. This small standard will be subverted, or at least shaken by the very first movement the mole shall make at the place where it stands. The shaking, or fall of the chip of straw, calls the mole-catcher to watch and take the animal within.

Also in the fifth case, where the mole comes not to work

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at the cuts made first by the mole-catcher, he supposes, that if, after making the aperture *kl*, he finds that the mole continues to work at the mole-hill *L*; he is now sure that it is between the point *l* and the mole-hill *L*, and his subsequent operations are the same as in the third case; that is, he must act as if there were but three mole-hills *L*, *K*, *L*.

In order to know whether a mole shall come during his absence to work under a mole-hill, he softly flattens the mole-hill with his foot; and if, on his return, he perceives a small eminence to have been raised on the level, he can then have no doubt but the mole has been working there.

However, in the sixth case, there is a different manner of operating from cases second, third, fourth, and fifth, where a person happens to be near a mole-hill at the moment when the mole breathes or blows at it. Should he be beside the mole-hill *L*, *fig. 4*, at the moment when the mole comes to work there; he does not use the uncertain method of the gardeners, who remove the mole-hill with the spade; but he cuts at *mn*, the tunnel communicating between the mole-hill and the next one *K*. This is a certain means of confining the mole between the mole-hill and the point *mn*. When the mole is thus inclosed, he proceeds, as in the first case, and lays open the space within which it is confined.

And in the seventh case, as when several fresh mole-hills are found near to some other mole-hills, old and dry, as *figs. 4* and *6*, which is more troublesome than any other of the mole-catcher, it is doubtful whether the fresh mole-hills do or do not communicate by tunnels with the old and dry ones. It is necessary to begin by making cuts between the old and the new hillocks, that the mole, when attacked in the new, may not be able to escape to the old. One may then proceed, according to circumstances, as in the foregoing cases. When this happens to be the case, too many cuts cannot be made, unless a person is anxious to spare the surface of the ground. It is good, for instance, as in *figs. 4* and *6*, to make a cut in the direction from *H* to *N*, and another in the direction from *H* to *O*; as there may be a tunnel in either, or tunnels in both of these directions.

But on this, it is observed, that "if one were constantly to watch a single mole, and not to proceed against any other, till after the first were taken; only a very few could be destroyed in one day. But when a farm is surveyed to discover the moles, all the fresh hillocks should be greatly flattened with the foot, and all the necessary cuts made,—as of these too many cannot be made, unless a person is afraid of breaking the surface too much. Set up little standards of straw with paper streamers. Then pass about from one mole-hill to another, and proceed as directed above. If you thus proceed against several moles at once, you must exercise great vigilance; otherwise, while you are busy with one mole, others may make a good passage across the cuts; and then you will have to begin with them anew. A mole will be longer in repairing and crossing one of the cuts, if a lump of hardened earth is put at the bottom. This precaution should be always taken." This is considered by *M. Dralet*, the translator of the above, as "of all the means hitherto employed for the extermination of moles, the easiest and the surest."

In the sixth volume of the *Agricultural Magazine*, a writer, however, proposes a more simple, easy, and effectual practice, and which is less troublesome and expensive. It is the invention of a common labourer, who clears nearly one half of the county of Glamorgan. His contrivance is composed entirely of oak, deal, or elm wood, but the first is the best, and common nails, and may be made by any carpenter or wheel-wright, and set to work by any common labourer. This is shewn at *fig. 8*, in the plate. *A* and *B*

are two boards of oak, forming the sides of the trap, eighteen inches long, five inches wide, and half an inch thick. *C*, the bottom of the trap, more fully explained in *fig. 9*. *E*, a piece of oak board, five inches long, two inches wide, half an inch thick, nailed on the top edges of the boards *A* and *B*, both to strengthen the trap and to keep the sides at a proper distance. *A* (*fig. 9*) is the trap with its bottom upwards. *C*, *C*, two pieces of oak board, five inches wide, four inches and a half long, half an inch thick. *D*, an aperture, nine inches long, four inches wide, made to receive the fall of the trap. *L*, a hole for a common clout-nail (forming the pivot of the fall) to turn in. And at *fig. 10* is *D*, the fall of the trap, nine inches long from *F* to *H*, three quarters of an inch thick (the distance from *F* to *G* two inches and a half, or three inches), from *G* to *H* half an inch thick and four inches wide. *G* shews the hole for the clout-nail forming the pivot. *M*, the dotted lines, shews the manner in which the upper part of the fall *D* must be bevelled, to prevent its falling both ways. At *fig. 11* is seen "the mole-pot, the uses of which will be more fully explained afterwards, composed of four pieces of oak board, each five inches wide at the top, nine inches wide at the bottom, twelve inches long, one inch thick, or thereabouts, having two ears, as at *K*, *K*, with a hole in each large enough to carry a piece of small rope or spun-yarn." And at *fig. 12* is shewn a mole-trap set in the side of a ditch.

In the view of finding the runs or tunnels, "the farmer or his servant must carefully examine the ditches of each field, in order to discover where the moles have made their main tracks; which having once found, and the trap set thereon, he may rest assured that every one passing through it will be inevitably destroyed; neither are their runs at all difficult to be found, as the only thing necessary to observe is, whereabouts they have broken out most on that part of the field the nearest to the ditch, in the side of which he must then make an opening with a small common spade, opposite to the nearest place where they are observed to work most, in order to open the run. Should the first endeavour to strike upon it prove unsuccessful, he will not fail to find it by searching thereabouts, either a little higher or lower. In common fields and uninclosed lands a different method must be pursued; and as, of course, there are no ditches, the higher grounds and banks will be the certain and proper place to search for their runs, which having once found, the workman must proceed in the following manner: First, a hole must be cut out the length of the trap, as represented in *fig. 12*, in such a manner that when it is inserted, the run may enter each of its ends, as shewn by the dotted lines; and also a hole or well of such a size that the mole-pot may be easily suspended therein. Secondly, a small clout-nail, of which he should take several in his pocket; or should he have forgotten to do so, a thorn out of the hedge must be thrust into the hole *n*, *fig. 9*, which also communicates with the hole *n*, *fig. 10*, and will effectually prevent the fall from acting. Thirdly, a small handful of fine earth, like that usually thrown up by moles whilst working, and which may be taken from one of their heaps, must be scattered all over the bottom of the trap so as to cover it, as well as both ends communicating with the run. Fourthly, a turf, something longer and wider than the trap, must be cut off the head-land, both to serve as a cover to it, as is seen at *PPPP*, (*fig. 12*), and as a certain mark by which it may be found with the greatest ease: and lastly, two pieces of spun-yarn must be fastened, one to each ear of the mole-pot *11*, *fig. 4*, by which it must be tied on the trap in such a manner, that any weight put upon the fall *D* at *11* may be thrown to the bottom; the carpenter having previously taken care that the weight

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weight of the fall from F to G shall more than counter-balance that from G to H, so that no sooner shall a mole be thrown into the pot than it will spontaneously resume its former situation, and be on a level with the rest of the bottom."

After "the trap with the fall has been fastened up by the clout-nail at *n*, the fine earth thrown over the bottom, the turf covered over the top, and the mole-pot properly suspended, by being tied over the whole; nothing further will be required to be done to it for three or four days, (for the moles must be allowed to pass freely along it for that time, as it will induce them to use their run without fear, and be the means of taking them with the greater certainty). The workman must now carefully examine his trap, and on gently hitting up the turf will plainly perceive their marks, (taking care, however, not to leave any opening for the light to enter), and pulling out the clout-nail at *n*, the trap will then be fit for working, and the fall will throw them into the mole-pot, out of which it is impossible for them ever to escape." And farther, "should the farmer have strictly followed the above instructions, and notwithstanding the moles still continue to work about his land, he may be certain they have forsaken the run on which he has set his trap, and he must therefore search for their new one." It is concluded that "the advantages arising from using traps of the above construction are, that the materials are to be procured every where; they can be made by any common mechanic at a very small expence, (the wood being used rough as it comes from the saw,) are very durable if made of oak; are not liable to get out of repair, and if they should, can be mended most probably by a labourer; they catch the whole year, and do not require looking after more than three or four times in that period, and that will comparatively require so short a time, that a workman may with ease look over all the traps on a very large farm; and supposing the fields to lie contiguous to each other, one trap for each ten acres would, on an average, be fully sufficient."

It is stated, by the first writer noticed above, that mole-traps are either simple or complex. The simple mole-trap is a hollow cylinder of wood, white-iron, or pottery, thirteen or fourteen inches long, and in diameter a little larger than the tunnels of the mole. This cylinder is closed at one end, and has at the other a sucker or valve pressing against an exterior-edging. When the mole comes to the extremity covered by the sucker or valve, she presses this back in order to continue her progress through the cylinder, and can return no more. Two of the traps may be united so as to form a double trap, having a valve at each end. By this the mole may be taken as she enters, whatever side she approach. It is added, that "the most remarkable of the complex traps used in Normandy, is a small piece of board fixed in the ground by four iron pins with cross points extending from them; and on these points the mole transfixes itself. It is very seldom that those succeed who make use of these and other mole-traps: for they do not use the fit means to entice the creature to the snare. That method is, nevertheless, very simple. Nothing more is necessary than to make a few holes by which the air may enter the tunnel of the mole, and give her notice of the injury done to her work. It will be easy to him who has read the preceding information and directions, to employ such mole-traps, in certain cases, with infallible success. He supposes, for instance, the two mole-hills A, B, (*fig. 2.*) and makes the aperture *dc*. If the mole stir the earth at *d*, he there presents the valve of either the simple or the double mole-trap; and he is sure of taking it. If, on the contrary, it presents it-

self at *e*, he must there use the trap. He acts in the same way in every one of the cases mentioned above. It may be easily believed, that there are some of those cases in which it will be convenient to use mole-traps. They are exceedingly useful when the mole-hills happen to be at considerable distances one from another, as in the end of winter. But, in the time of drought, and when the weather is very cold, the hillocks are so very near to one another, that the traps can be of little use.

But the common method of destroying moles is, however, by traps, made in the following manner: take a small board, about three inches and a half broad and five inches long; on one side thereof raise two small round hoops or arches, one at each end, like the two hoops or bails of a carrier's waggon, capacious enough for a mole to creep through easily: in the middle of the board make a hole about the bigness of a goose-quill, and have in readiness to put into it a flick about two inches and a half long, fitted at one end to the hole and a little forked at the other. Cut also a hazel or other stick, about a yard or a yard and a half long, which will rise with pretty strong elasticity when it is stuck into the ground; and to the end of this stick fasten a very strong noose of string or horse-hair, made so as to slip easily. Have likewise in readiness four small hooked sticks; then go to the furrow or passage of the mole, and after you have opened it fit in the little board with the hended hoops downward, so that when the mole passes that way it may go directly through the two semicircular hoops. But before you fix the board in this manner, put the hair string through the hole in the middle of it; place the noose in a circular form, so as to make it answer to the two hoops; put the small stick before mentioned gently into the hole in the middle of the board, so as just to stop the knot of the hair string, without entering so far as absolutely to tighten it. Then fasten the board down with four hooked sticks, and cover it with earth. When the mole, passing in its furrow, comes into this trap, it will displace the small stick that hangs perpendicularly downward, the knot will then be drawn through the hole, and the noose instantly straightened by the rising of the end of the hazel stick to which it is fastened, will catch the mole round the neck or body and hold it fast.

MOLES, Fumigating of. This is a mode adopted in order "to suffocate the mole in its retreat, for which some advise to take a small nut-shell, or any little vase, solid and of small capacity, and in it to burn cedar root, or wax and sulphur, with a portion of straw, then to stop up every hole by which the smoke might issue out. The success of these methods is very uncertain, and indeed none at all in the hands of any person not well acquainted with the artifices and haunts of the mole. Sometimes all the mole-hills in a garden or a meadow, whether fresh or dry, communicate by many different passages with one another, as has been shewn. In this case all these mole-hills must be pressed down and closed up. But in doing this you will yourself preserve the mole from the threatened suffocation. Suppose, for instance, that the mole which made the hillocks (*fig. 4.*) is to be suffocated, and that you put the combustible matters in at H. If the mole be at I or L, the smoke will be hindered from penetrating beyond I, by your shutting up the passage there; and your precaution to ensure the death of the mole will prove the very means of its escape. It is only by cuts in the passages that fumigation can be made effectual. To suffocate the mole of the hillocks (*fig. 4.*), make the breach *lk*: close up its extremities; put in your combustible matters between *k* and F, and between *l* and L, after leveling the hillocks L, F. But you must first ascertain whether the

mole-hill, H, (*fig. 4.*) has any communication with those of *fig. 6*, and if it has, cut off that communication by other breaches," in the manner already described.

There are some other modes proposed for the destruction of this animal, but they are much less certain than those which have been just detailed.

MOLES, Poisoning of. It may be noticed, that for this purpose there are several recipes; some propose to throw into their retreats nuts, which have been pierced on one side and boiled in a strong lixivium. Others boil such nuts in water, with a handful of hemlock, and use them as above. In some countries people take the root of white hellebore, with the bark of dog's colewort pulverized and sifted; mix this with barley-meal: steep the mixture in wine and milk; cut it in small pieces, then throw it into the mole-hills. In other countries it is usual to take the green of a leek, or to put arsenic on the white, and bury this in the freshest mole-hill that can be discovered. These poisons, it is observed, are in general used injudiciously. The mole rarely seeks its food at the surface where its hillocks are placed. It pushes back the earth, as it works, to the extremity of its tunnel. That earth raises the layer next above it; and by the continual repetition of this process, the mole-hill is at last formed. The mole, while undisturbed, keeps always within its tunnel; and it is into the tunnel, therefore, that the poisoned bait ought always to be cast, instead of being left in the hillock. In order to destroy the mole which formed the mole-hills A, B, (*fig. 2.*) make a cut, *d e*, in the tunnel which communicates between them. Put the poisoned bait then into it, at either *d* or *e*, or even between them. The animal will come of course to repair the breach, will find the substance, eat it, and be destroyed.

MOLE-Hill, a term applied to a small mouldy heap of earth, thrown up by the mole on grass or other lands. It has been observed by a late writer, that "in the more rich and fertile soils, hills of this sort are frequently thrown up in great numbers, from their abounding more with the food of the subterraneous animals that produce them. Meadows are often extensively and seriously injured by them, on account of their depth of soft humid soil. Moles usually reside, destroy, and render useless the grass, not only of the very spot where the hills are raised, but likewise to some extent immediately around them, as well as impeding the free course of the scythe: for these reasons, the extermination of moles becomes an object of great consequence to grass husbandry. In the early spring months, when such hills are in a tolerably dry and powdery state, no time should be lost in spreading them out, and dispersing them, in as even and regular a manner as possible, over the surface of the sward that adjoins them; as, when they remain long without being sealed, they do considerable injury to the grass plants underneath them, by blanching and rendering them tender. This business may be very conveniently performed by a common iron-toothed garden rake. But it is invariably the best method never to suffer the animals to remain in the land, but to procure an expert mole-catcher to destroy them, and thus wholly prevent the hills being thrown up." As soon as the hills have been dispersed over the land in the manner directed above, the operator should be careful in raking up all the small stones, that may have been thrown out with the mould; as when left upon the ground, especially where it is to be mown, they prove a very disagreeable impediment to the scythe. But before this is done, it is beneficial to make use of a bush-harrow.

MOLE-Plough, an implement intended for the purpose of draining land, by forming a sort of pipe in it.

This plough was long ago invented by Mr. Adam Scott, and as since improved, and made use of in the midland counties, is an implement which, in suitable soils and situations, as in parks, pleasure-grounds, and where much regard is had to the surface-appearance of the land, may be of considerable benefit in forming temporary drains. It makes a drain, without opening the surface any more than merely for the passage of a thin coulter, the mark of which soon disappears. This instrument is chiefly employed in such grass-lands as have a declination of surface, and where there are not many obstructions to contend with: but it may be used in other kinds of land, as on turnip grounds that are too wet for the sheep to feed them off, or where, on account of the wetness, the seed cannot be put into the earth. With this plough the drains should be made at the distance of ten or fifteen feet, in straight lines, and also contrived so as to discharge themselves into one large open furrow, or grip, at the bottom of the field. As it requires great strength to draw this implement, it can only be used where a good team is kept. It is suggested by an intelligent farmer, that in deep clayey soils it may be highly useful; but that, where there are beds of gravel or sand intervening, it cannot be employed with advantage. And it has been found useful in thin peaty soils.

This sort of plough is represented at *fig. 1*, in *Plate Agriculture (Ploughs)*, in which *a* is the beam; *b*, the coulter; and *c*, the cone which forms the drain. It has been lately improved, so as to require much less force of draught, by having wheels placed before, and a roller behind. But a greater and more important improvement has been made on this tool by Mr. Lumbert. Mr. A. Young states, that "in a communication from his son, inserted in the 36th volume of the *Annals of Agriculture*, mention is made of this plough having been greatly altered by Mr. Lumbert of Rislington Wick, near Stow, on the Wolds of Gloucestershire, who worked it by eight men turning windlasses. This he takes to be the first public notice of any such invention. Thomas Estcourt, esq. M. P. for Cricklade, and a member of the Board of Agriculture, had, since that period, several times mentioned the same object to him. In March 1804, he had the goodness to inform him, that the plough was then working at Cricklade; and, upon his expressing a wish to see it, obligingly proposed to write to Mr. Wells, surgeon at Cricklade, informing him of his intention, and requesting his writing to Mr. Lumbert, the inventor, to desire his presence at the same time. These necessary previous steps being taken, he arrived at Cricklade, March 21st, and had the satisfaction to find that the plough was then at work within a mile of the town, whither he repaired with Mr. Wells and Mr. Lumbert. The field in which the machine was working belongs to Mr. Champenoun of Cricklade; the soil a very rich surface loam upon a clay bottom, which made it wet, and demanded the operation of draining. The state of the surface (though grass) was such as would have been very materially injured, by so many horses as must have been necessary to draw the mole at the depth he found it working, which was from 17 to 18 inches. Eight women work it: and in respect to the labour exerted, it is sufficient to note that Mr. Lumbert contracts for the work at three halfpence per perch, lug, or rod, of $5\frac{1}{2}$ yards; his foreman contracting with him for doing it at three farthings, the machine being found by the master, the man paying himself and the women out of that sum. The plough does, according to soil and circumstances, from 150 to 200 perches a-day: 300 have been done. At 200, three farthings a perch are 12s. 6d. per diem; the eight women at 8d. are 5s. 4d., leaving

ing 7s. 2d for the foreman's pay, and the reparation of the chain, the chief object in the repairs, as it breaks often, and wants the addition of a false link whenever that accident happens. He timed the motion of the plough for some rods, and found the average five yards in a minute. At this speed, 490 perches would be done in nine hours; but the time of moving the windlafs, frame, and anchor, is a large deduction, though he should have conceived not sufficient to reduce the performance to 200 perches. He could not but much admire the efficacy of the anchor and *scorts*, in quickly fixing and preserving the steadiness of the machinery, in resilience of so great a force as is necessary to move the mole deep buried in clay."

And it is added, that "the present construction of the machine was the result of many experiments, in making them under divers variations. Mr. Lumbert speaks of two circumstances particularly, which cost him much attention and many trials: the line of traction, and the due elevation of the beam. He has not comprehended why the beam should be elevated (other circumstances remaining the same); why any elevation further than parallel to the horizon should be necessary, the parts connected forming one piece in either case. This question, which is intimately connected with the structure of all wheel-ploughs, and is found under great variations, from the elevated beam of the Norfolk plough to the very depressed position of the beam of the Hertford one, deserves more attention than it has commonly met with. The line of surface being 1 : 2, and the tendency of the share into the ground 1 : 3, should the elevation of the beam be proportioned as 1 : 4? The line of traction, in Mr. Lumbert's plough, being to a little above 1, suppose his mole working at 5, he seems to have proportioned the elevation of his beam somewhat to the same angle above ground at 6, that is, at 22½ degrees. He found it necessary that the line of traction should cut the centre of the front roller, but not drawing by it. If a line be drawn from the horse's shoulder, while drawing, to the heel of the Norfolk plough, he has often found, when the ploughs are said to go well, that such line passes by the centre of the wheels; but the Norfolk plough is truly a wheel machine, the draught being to the carriage, and not to the plough itself: whereas Mr. Lumbert draws from the heel of his beam. The line of traction, however, in Mr. Lumbert's machine, is always varying: the angle is very acute, when the women begin to turn; but necessarily becomes less and less so, till the mole arrives at the windlafs frame. The elevation of his beam throws a great weight on it, by counteracting the tendency of the mole into the ground. Quære, if this line of traction be not to the centre of the compound resistance? If so, it explains the reason for his greater ease of draught; but it does not explain why he should not have availed himself of high wheels in front, instead of a low roller, converting his machine into a true wheel-plough, and drawing from the carriage; the chain from the plough heel being fixed to the carriage, as that from the coulter (or near it) is in the common wheel-plough."

The same writer farther states, that "Mr. Lumbert has made this great improvement of the mole-plough about seven or eight years, and the success attending it has been considerable. Mr. Poulton of Cricklade and Mr. Wells have used it, as well as Mr. Champernoun. Mr. Coxé at Water Eaton has drained, as he was informed, some hundreds of acres with it. Many have used it at Perton; nor had Mr. Adams heard of any failures. All known here have been on clay; but they have heard of its answering on less stiff bottoms. The drains ran well after three years."

It is added, that "Mr. Lumbert, in their examination

of the machine, desired him to observe that the bottom of the mole was not at all bright, there being no wear there, while the upper parts were worn quite bright; and from this circumstance he concludes, that any attention to keep frosts out of the slit made by the coulter and standard is unnecessary. He conceives that the force of pressure, and consequent plashing, is all on the upper side of the pipe, inasmuch that he is firmly persuaded that the operation is chiefly at the bottom of the pipe, where the soil is left porous, on comparison with the top of it: and he is so much of this opinion, that he conceives the water, which runs down by the slit, is more likely to be conducted over the pipe than to get into it." Mr. Young states, that "he merely reports his remarks without a comment."

It is hinted, that "the improver goes to any part of the kingdom with his machine for drawing of 1½d. per rod; but if to a distance, must have insured work, in the proportion of 200 rods for every mile he travels going out. At any considerable distance, this amounts to so large a quantity, that, in many cases, it would be advisable for several neighbours to join for providing sufficient employment. He sells the tool complete at 50 guineas, having a patent. He can go 24 inches deep; and he has, on his own farm, drains that have stood well seven years. When the ditch of a field is not in such a direction as suits for the conveyance of the water from the pipes made by the mole, or other circumstances render it necessary to have a bottom main drain to take the water, his mode of making these *clay-drains*, as he calls them, is by digging to a certain depth with common spades; and at the bottom of the trench so opened he takes a spit, with a narrow spade that has a cutting edge. This tool opens a trench, which just receives a jointed wooden frame, with a chain at the end, by which it is drawn on by the application of a lever. This frame, fitting the space left by the narrow spade, is covered with clay, rammed close and firmly to it, being first wetted, that it may slide from this clay vault when drawn on by the lever: and from much experience he finds these drains perfectly safe and durable. Over the rammed clay mould, enough to fill to the surface is thrown in."

The writer also mentions, that in discoursing "with him on other applications of the power he exerts in drawing the mole, he informed him that Mr. Barker of Fairford has a water, that was so choked up with mud and weeds, that a duck could scarcely swim in it. He applied the windlafs, frame, and chain, to drag out all; and with such success, that no other method would have cleansed the water at so cheap a rate: some drag, scraper, or other contrivance, must of course be necessary for taking and retaining the mud," &c. And Mr. Young supposes, that "a very useful application of this power would be to the purpose of drawing turnips or cabbages from off wet land, which, by common carting, is attended with so much mischief. He has seen temporary sheds roughly erected, on the borders of turnip-fields in Suffolk, for stall-feeding beasts: the addition of the windlafs, to draw the turnips to such sheds, would be extremely important. Another application of this force, well deserving attention, is, for drawing the machine which he has seen in the maritime part of Essex, wherewith cross-roads are levelled. Where ruts are deep, and combs and quarters high, with other inequalities, this tool, a sort of harrow, might be very cheaply used for effectually smoothing the whole, and improving the roads at a very small expense." And as "much the most economical system in which the thrashing-mill can be applied is, that of a circular iron rail-way, whereon to draw the stacks to the mill, as he has fully explained in the 33d volume of the Annals: in-
stead

Head of the application of the power of the wind or horses to draw the flacks, the windlafs and anchor of the mole-plough might be moft cheaply applied. Another application of this power which he fhall mention is, for the draught of ploughs and other machines, when comparatively tried: the force exerted would be more regular and ftady than that of horses, or even oxen; and the only attention particularly demanded would be to keep the chain parallel to the furrow, and at the right diftance from it."

But Mr. Young fuggells, that "in the operation of hollow draining itfelf, a moft important defideratum yet remains, and that is the drawing a plough that fhall cut an open trench, for filling up with ftraw, wood, or ftone. Two fuch ploughs have been invented: Mr. Arbuthnot's, a plate and explanation of which are to be feen in his "Eastern Tour;" and Mr. Makin's, which is kept in the Society's repository in the Adelphi buildings. The trampling of fo many horses as thefe ploughs required, was the great objection to their ufe. This ferious evil is done away in the windlafs fcheme; and he cannot but recommend to Mr. Lumbert's attention the improvement of one of thefe ploughs, or the invention of another, for executing thefe drains by means of his windlafs. He ftates, that "in all forts of hollow draining, Mr. Lumbert is decidedly of opinion that the cuts fhould be in the direktion of, and with the flope of the land: not diagonally acrofs it, which is the common praftice. In the latter method, the drains operate but on one fide: cutting off the courfe of the water, as it defcends, it drains the land only below the cuts; but if made with the flope, they operate equally on either fide; and as he fupposes the veins or pores of the foil, which conduct the water to act in every direktion, provided the water itfelf is taken away, his cuts in the direktion of the flope receive it laterally from every portion of the land between the drains, the defcent from which to the bottom of the drain is greater than the angle of the defcent of the natural furface of the field. It would not be eafy to bring this opinion to the teft of exaët experiment; but a very ingenious farmer in Suffolk, Mr. Simpson of Witnefhams, near Ipfwich, has the fame conviction, and has drained fome hundreds of acres very fuccefsfully upon this plan."

But the nature, ufe, and application of this implement may, however, be better underftood from fig. 2, in *Plate Agriculture (Ploughs)*, in which,

1. The beam.
2. The mole, to which fegments for lengthening it fcrew on at 3.
4. The roller at heel, on which it preffes.
5. The chain, 50 to 60 yards long, which winds on to the two cylinders, 7, 7.
6. A pulley, around which the chain, 5, plays.
- 8, 8, 8. Windlaffes turned each by two women.
9. Stays, which entering the ground, affift in keeping the machine ftady.
10. The anchor.

And the proportion and refpective angles of all the parts may be meafured by the feale which is given in the plate. See **PLOUGH**.

MOLE-Traps, the name of fuch traps as are contrived for the purpofe of taking and deftroying moles. They are of feveral different kinds. See *MOLE-Catching*.

MOLE, *Mola*, or *Mola Carneæ*, in *Physiology*, a mif-ftapen mafs of hard flefh, fometimes generated in the wombs of women, inftead of a fœtus; called alfo a *false conception*. It is, however, a very rare produktion; what is called a mole by women being generally found on examination to be nothing more than coagulated blood. The following ap-

proaches neareft to what the ancients conceived to be a mole, of any thing that has occurred to the writer of this article. A woman, about twenty-feven years of age, was delivered of a female fœtus, and its placenta, in which nothing uncommon was obferved; and although the uterus remained of an unufual fize, yet the pains not recommencing, there was no fufpicion entertained but that its bulk was occafioned by coagulated blood. On the third day the pains became violent, and this monfter was born. Its ftape was fpherical, but fomewhat flattened. It meafured in its largeft diameter eight inches, and weighed about eighteen ounces. It received its nourifhment by an umbilical cord, to which was attached a portion of membranes, and although no placenta was found, it is probable it had a fmall one, and that it was inclofed in its own involucreum. It was completely covered with a cuticula, and a little above the part where the navel-fting terminated, there was a hairy fealp covering a bony prominence, fomewhat refembling the arch of the cranium. On diffection it was found to be plentifully fupplied with blood-veffels, proceeding from the navel-fting, and branching through every part of it. It had a fmall brain, and nerves paffing from thence through the foramina of the bones; but no refemblance of any thoracic or abdominal viscera. The reft of its bulk was made up of fat. This was inferted, with the plate of the external appearance of the object, in the feventy-firft volume of the *Philofophical Tranfactions*.

MOLE, *Moles*, a mafive work formed of large ftones laid in the fea by means of coffer-dams, extended either in a right line, or an arch of a circle, before a port; which it ferves to clofe; to defend the veffels in it from the impetuofity of the waves, and to prevent the paffage of fhips without leave.

Thus we fay the mole of the harbour of Meffina, &c.

MOLE is fometimes alfo ufed to fignify the harbour itfelf.

MOLE, *Moles*, among the Romans, was alfo ufed for a kind of maufoleum, built in manner of a round tower on a fquare bafe, infultate, encompassed with columns, and covered with a dome.

The mole of the emperor Adrian, now the caftle of St. Angelo, was the greateft, and moft ftately of all the moles. It was crowned with a brazen pine-apple, in which was a golden urn containing the afhes of the emperor.

MOLE, in *Zoology*. See **TALPA**, and the article **MOLE**, *supra*.

MOLE-Cricket, *Grylotalpa*, in *Entomology*. See **GRYLIUS**.

MOLECULE, **MOLECULA**, in *Physics*, a little mafs or portion of any body.

The air, by refpiration, infinuating itfelf into the veins and arteries, endeavours by its elaftic power to divide and break the molecules of the blood, which on their part refift fuch divifion.

MOLEEAH, in *Geography*, a town of Bengal; 54 miles W.N.W. of Midnapour.

MOLENE, a fmall ifland in the Englifh channel, near the W. coaft of France; fix miles S.E. of Ufhant. N. lat. 48° 24'. W. long. 4 52'.

MOLENES, a fmall ifland in the Englifh channel, near the coaft of France; 13 miles W. of the ifland of Bas. N. lat. 48° 47'. E. long. 3° 33'.

MOLENPURG, a town of Auftria; 16 miles S.W. of Crems.

MOLES CARNEÆ, in *Anatomy*, a name given by Vefalius, and others, to a mufcle called by Winflow, Albinus, and others, the *complexus*. Spigelius calls it the *carneæ moles trigenino adjuncta*.

MOLES Carneæ labia formans, a name given by Fallopius

to the muscle called by *Albinus orbicularis oris*, and by *Cowper confriator labiorum*.

MOLESTANDO. See *Nos Mollands*.

MOLESWORTH, *ROMNEY*, in *Biography*, viscount Moleworth of Ireland, descended from an ancient English family, was born at Dublin in 1656. Having received the elements of a good education, he was sent to complete his studies at Dublin college. He married, at an early age, the sister of the earl of Bellmont. When the prince of Orange came to England in 1688, Mr. Moleworth rendered himself conspicuous as a friend to liberty and the Protestant religion, for which he was afterwards attainted and his estate sequestered by king James's Irish parliament. The success of the Popish king, even in Ireland, was very short lived, and Mr. Moleworth was immediately noticed by king William, who raised him to the rank of privy-counsellor. In 1692 he was sent out envoy-extraordinary to the court of Denmark, where he resided three years. He had not, however, been very long in his situation before he found reason to be disgusted with the manners and habits of that newly enslaved country, and his eagerness to infill upon privileges which he conceived were his due in the high character of ambassador, gave offence, and he was forbidden to enter the court. Without the ceremony of taking leave, he withdrew to Flanders, on pretence of business, and thence returned to England, where he set about writing "An Account of Denmark." This work, written probably in resentment for the ill treatment he had met with, gave such an unfavourable account of the government and nation, that it was noticed by prince George of Denmark, consort to the princess Anne, afterwards queen of England, and a memorial was presented to king William, by the Danish envoy, complaining of the insult. It was undoubtedly one of the publications of that period which was most hostile to arbitrary power, and which exposed with the greatest freedom the arts by which public liberty was overthrown. Dr. King was employed to answer this work, in the performance of which, being furnished with facts by the Danish resident, he was enabled to detect some mistakes and misrepresentations: the book was however well received, and was translated into several foreign languages. For the author it procured the esteem and friendship of lord Shaftesbury, in unison with whose political principles he always acted. Mr. Moleworth was continued a member of the privy council till the latter part of the reign of queen Anne, when he was removed on account of a complaint from the clergy in convocation, to whose increasing influence he was always inimical. On the accession of George I. he was taken again into favour, and in 1716 was called to the house of lords in Ireland, by the title of viscount Moleworth. After this he spent his time chiefly in a literary retirement, connected with and much esteemed by several men of learning and liberal principles, among whom were Locke, Molyneux, and Toland. To the latter he was a warm friend and benefactor, though his own circumstances were narrow. Lord Moleworth died in 1725, at his seat near Dublin, in the sixty-ninth year of his age. Besides the work already referred to, he wrote an address to the house of commons for the encouragement of agriculture; and to his pen were ascribed several temporary publications in favour of the English constitution, and the general principles of liberty. One of his daughters, Mary, the wife of George Monk, esq. at her death, in 1715, left a collection of poems, which her father published, and dedicated to the princess of Wales, afterwards queen Caroline. *Biog. Britan.*

MOLEVETO, in *Geography*, a town of the island of Ceylon.

MOLFETTA, a town of Naples, in the province of Bari, on the coast of the Adriatic, the see of a bishop; eight miles E.S.E. of Trani. N. lat. 41 18'. E. long. 16 39'.

MOLIERE, *JOHN-BAPTIST POUQUÉLIN DE*, in *Biography*, the most celebrated of modern writers in comedy, was born at Paris in 1620. His father, who was valet de chambre upholsterer to the king, and kept a broker's shop, designed to bring him up to his own employment, and gave him a conformable education. The youth, without any advantages of education beyond those of mere reading and writing, imbibed a taste for literature, and was sent to the Jesuits college as a day-scholar. His assiduity was soon observed; he became connected with Chapelain and Bernier, with whom he attended lectures in philosophy, under Gassendi. His father, with increasing years, became very infirm, and the business of the royal household was devolved on the son, and he attended Louis XIII. to Narbonne in 1641. On his return to Paris he resolved to devote himself to theatrical employments. He connected himself with a company of young persons, who acted in the suburbs of St. Germain, and assuming the name of Moliere, composed several little pieces of the comic kind, and performed his part on the stage. At length he joined La Bejart, a provincial actress, and they formed a company, which, in 1653, represented at Lyons his first regular comedy in verse, "L'Étourdi." This was followed by "Le Dépit Amoureux," and "Les Précieuses ridicules," exhibited at Beziers, where Moliere was favourably received by the prince of Conti, who was chief of the states of Languedoc. He next visited Grenoble and Rouen, and from the latter came to Paris, under the protection of Gallon, duke of Orleans, who introduced him to Lewis XIV. He soon obtained permission to open a theatre in the metropolis, which was first in the old Louvre, and afterwards in the Palais Royal, and in the year 1665 he was placed in the service of the king, with a pension. He rose in reputation as a writer by the new pieces which he presented to the public, and became more and more perfect as he advanced in experience and observation. At mature age he married the daughter of the actress Bejart, who also followed the same profession, and he is said to have incurred very deservedly the same sort of ridicule as that which he bestows plentifully upon the poor husbands in his comedies. In friendship he was more lappy, and he numbered among his intimates not only men of wit, but some of the greatest persons about the court. He died in consequence of his exertions in acting a principal part in his play, "Le Malade Imaginaire." He was labouring under a slight pulmonary complaint, and was strongly urged to postpone the representation: "What," says he, "will become of so many poor people who depend on it for the very means of subsistence. I should reproach myself for having neglected a single day to supply them with that of which they stand in need." He exerted himself with unusual spirit, and his efforts brought on the rupture of a blood-vessel, by which he was suffocated. This event happened in February, 1653, when he was only in the fifty-third year of his age. By almost the general consent of Europe, he is placed at the head of that genuine comedy, which has for its subject the ridiculous in character and manners; and it is agreed that no one ever united more pleasantry in dialogue and incident, with more good sense and penetration in selecting just objects for comic satire. He is also regarded as the great reformer of the French theatre in respect to comedy, as Corneille was in respect to tragedy. His more serious compositions, and those written in verse, are by his countrymen esteemed his master-pieces, especially:

especially the "Misanthrope" and the "Tartuffe." The latter, touching upon religious hypocrisy, excited a great clamour against him from the pretended devotees, who had interest to procure a prohibition of its second representation from the parliament. This temporary attack has not prevented the "Tartuffe" from retaining its place as one of the great ornaments of the French stage. Moliere had always a large portion of the philosophy of good sense, and rarely failed to discern the weak part of what he chose for the topic of his farcasm. He had also a just sense of propriety in the conduct of life, and in serious humour he is always the friend of honour and integrity. His own character was, in many respects, estimable. He was kind, obliging, and generous. Nevertheless, after his death, the archbishop of Paris, Harlai, a man of loose morals, without, probably, half the good qualities of the actor, but desirous of pleasing the rigorists of the Roman church, refused him Christian burial, and the king's authority was requisite to procure him private interment in a chapel belonging to the church of St. Eustace. The bigotry of the mob, whom the priests had kept ignorant to make them engines in their own cause, impeded even this obscure ceremonial, and they could not be dispersed till money was given them for the purpose. "Such," says an able biographer, "was the treatment of a man who was an honour to his country, and who will ever rank among the principal ornaments of the age in which he lived! No one was more impressed by a sense of his merit than the great Conde, who, in reply to a wretched rhymist, that had brought him an epitaph on Moliere, "Would to heaven he had presented me with thine!" He is honoured with memorials by Boileau, Voltaire, and the king, who being asked to name the first writer that had appeared in his reign, named Moliere, without the smallest hesitation. His style in prose is perfectly natural and easy: in verse he has been accounted incorrect and careless. As an actor he excelled only in comedy: his voice was feeble and indistinct, but his strong features, animated by intelligence, rendered him the perfect representative of the characters, in his own pieces, which he took upon himself. His works have been a thousand times reprinted: the best edition is said to be that of Bret, at Paris, in six volumes, with commentaries. Moreri.

MOLIERES, JOSEPH-PRIVAL DE, a celebrated French priest and mathematician, who flourished in the eighteenth century, was born at Tarascon, in the county of Foix, in the year 1677. Owing to a tender and delicate constitution, he chose for himself a life of study, and became, in a short time, famous for his learning on divers topics, but particularly in the several branches of belles lettres and mathematics. His elder brother, who had obtained considerable rank in the army, having been slain in battle in 1695, M. Moliere's parents were desirous that he should settle in the world, but his love of study rendered their persuasions ineffectual. That he might put an end to all importunity on this head, he entered at once into the church, and was ordained priest in the year 1701. He afterwards entered in the congregation of the oratory, and taught the classics and philosophy with great success in several of their seminaries. Some years after this, having read and greatly admired the works of father Malebranche, he was anxious to become acquainted with their author; and for that purpose quitted the oratory and repaired to Paris. Here he attached himself closely to that philosopher, and during his stay in the metropolis, he presented several memoirs to the Academy of Sciences, and in 1721 he was admitted into it as an adjunct to the mechanical class. Two years afterwards he obtained the professorship of the College-royal, and in 1729 rose to the

rank of associate in the Academy of Sciences. He had already published a work, entitled "Mathematical Lessons, &c.," in which the principles of algebra and arithmetical calculations are methodically laid down, and the theorems explained and demonstrated. After this, which was well received, he published four volumes of "Lectures on Natural Philosophy, containing the Elements of Physics determined solely by the Laws of Mechanics, &c." This was said to be a very whimsical performance, in which he endeavoured to unite the system of Descartes with the principles of Newton, and he attempted to rectify the ideas of the French, by the experiments of the English philosopher. In 1741 he published the first part of his "Elements of Geometry," intended as an introduction to his physical lectures. He was a very irritable man, which led him frequently into passions, of which one was the cause of his death in 1742. In other respects he was reckoned a very amiable character, but was apt to be so absent, or absorbed in his studies, as to appear almost wholly insensible to surrounding objects. His infirmity in this respect became known, and he was accordingly made the subject of depredations. A shoe-black, once finding him profoundly absorbed in a reverie, contrived to steal the silver buckles from his shoes, replacing them with iron ones. At another time, while at his studies, a villain broke into the room in which he was sitting, and demanded his money; Moliere, without rising from his studies, or giving any alarm, coolly shewed him where it was, requesting him, as a great favour, that he would not derange his papers. Moreri.

MOLIERES, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban; 10 miles N. of it. The place contains 2493, and the canton 6870 inhabitants, on a territory of 132½ kilometres, in seven communes.

MOLIETTA, a town of Naples, in Bari; eight miles E.S.E. of Trani.

MOLILLA, a town of Hindoostan, in Bednore; 10 miles E. of Bednore.

MOLIN, a town of Persia, in Khorasan; 16 miles N.W. of Zeuzan.

MOLINA, in *Biography*. See MOLINISTS.

MOLINA, in *Geography*, a small town of Spain, in the province of Murcia, pleasantly situated on the borders of a valley, which is watered by the Sagara. It is surrounded by considerable plantations of all kinds of trees, and fertile rich gardens, embellished with oranges, lemons, olives, pomegranates, and palms. The streets are large, straight, airy, and pleasant: the number of inhabitants is about 3000. The parish church is a handsome structure, but deformed by bad paintings; eight miles N. of Murcia.

MOLINA, a town of Spain, and capital of a lordship in New Castile, situated on a river of the same name, which runs into the Tagus, 15 miles S.W. of it; 100 miles N.E. of Madrid. N. lat. 41° 8'. W. long. 2° 1'.

MOLINA, in *Botany*, Lamarck Dict. v. 4. 227. Cavan. Monadelph. 435. t. 263, so called by the writer last mentioned, in honour of John Ignatius Molina, author of a natural and civil history of Chili, from which Jussieu has adopted several genera, with most uncouth names. See GÆRTNERA.

MOLINÆA, so denominated by Commerçon, according to Jussieu, in memory of Johannes Molinæus (Jean des Moulins,) to whose assistance Dalechamp had recourse in the composition of his laborious work, after John Bauhin had been driven away from Lyons by the bigotry of the Papists; his learning and excellent character having made him too conspicuous there for a Protestant, like his father at Paris.

(See

(See *BATHUS*.) Commerson, it seems, intended at the same time to commemorate his friend Desmoulins, author of an arrangement of the plants about Clugni, published in Durande's *Flore de Bourgogne*—Juss. 248. Willd. Sp. Pl. v. 3. 329. Lamarck Illustr. t. 305. (Trigonis; Jacq. Amer. 102? Juss. 248?)—Class and order, *Ostrandria Monogynia*. Nat. Ord. *Tribilata*, Lim. *Sapindi*, Juss. See *CUPANIA*, to which *Molina* and *Trigonis* are there referred by our excellent predecessor, the Rev. Mr. Wood, on the authority of Mr. Dryander, or rather of Lamarck. From an examination of Commerson's specimens, we have no doubt of the propriety of this measure. We find an evident style in *Molina*, though perhaps it may not be protruded till after impregnation; but this removes one of Willdenow's objections. As to the *arillus*, or tunic of the seed, Lamarck's plate, fig. i, seems to indicate one, though not perhaps so remarkable as that in Plumier's Nov. Gen. t. 19. *Cupania*, being the oldest name and unexceptionable, is necessarily preferred to the above.

MOLINE', in *Heraldry*. A cross moliné is that which turns round both ways at all extremities, though not so wide or sharp as that said to be anchored.

MOLINET, CLAUDE DU, in *Biography*, a learned French ecclesiastic and antiquary in the seventeenth century, was born at Chalons, in Champagne, in the year 1620. Having been instructed in the rudiments of learning at his native place, he was sent to Paris to go through his course of philosophy. Here he entered among the canons-regular of St. Genevieve of the order of St. Augustine, and afterwards became attorney-general of that congregation. He might have been raised to higher dignities, but his love of study and retirement induced him to decline them. Medals and antiquities of various kinds were his favourite subjects of pursuit, and having been attached to them from almost his earliest years, he had collected a considerable cabinet, which he annexed to the library of St. Genevieve, together with other rarities and curiosities. He was employed by Lewis XIV. to arrange his cabinet of medals, and augment their numbers, as well as to purchase agates and other precious stones, of which father Molinet was reckoned an excellent judge. He added more than 800 medals to the royal collection, and was amply and nobly remunerated by his sovereign's liberality, of which the library at St. Genevieve supplied abundant evidence; for the improvement of that institution was the prime object to which all the fruits of his labours were devoted. He died in 1687, at the age of sixty-seven. He is known as an author by learned notes to an edition of the letters of Stephen, bishop of Tournay; "Historia Summorum Pontificum a Martino V. ad Innocentium XI. per eorum Numismata;" "The Cabinet of the Library of St. Genevieve;" "Reflections on the Origin of Secular Canons, and on the Antiquity of Canons-Regular;" and other works which display much learning, and will afford gratification to antiquarians. Moreri.

MOLINEUX'S HARBOUR, in *Geography*, a bay on the S.E. coast of Tavai-Poenamoo, the southern island of New Zealand. S. lat. 46° 24'. W. long. 189° 50'.

MOLINISTS, in *Ecclesiastical History*, a sect in the Romish church who followed the doctrine and sentiments of the Jesuit Molina, relating to sufficient and efficacious grace. Lewis Molina, after whose name this sect was called, was a Spanish Jesuit, and professor of divinity in the university of Eborac, in Portugal. In the year 1588, he published a book, to shew that the operations of divine grace were entirely consistent with the freedom of human will; and he introduced a new kind of hypothesis to remove the difficulties attending the doctrines of predestination and liberty, and to

reconcile the jarring opinions of Augustinians, Thomists, Semi-Pelagians, and other contentious divines. Molina affirmed, that the decree of predestination to eternal glory was founded upon a previous knowledge and consideration of the merits of the elect; that the grace from whose operation these merits are derived, is not efficacious by its own intrinsic power only, but also by the consent of our own will, and because it is administered in those circumstances, in which the Deity, by that branch of his knowledge, which is called *scientia media*, foresees that it will be efficacious. The kind of prescience, denominated in the schools *scientia media*, is that foreknowledge of future contingents, that arises from an acquaintance with the nature and faculties of rational beings, of the circumstances in which they shall be placed, of the objects that shall be presented to them, and of the influence which these circumstances and objects must have on their actions.

The great antagonists of the Molinists were the Jansenists.

MOLINO, in *Geography*, a town of Naples, in Abruzzo Ultra; 13 miles S.S.E. of Aquila.

MOLINOS, in *Biography*. See *QUIETISTS*.

MOLINOSISTS, in *Ecclesiastical History*, a sect among the Romanists, who adhere to the doctrines of Molinos. These are the same with what are otherwise called Quietists.

MOLISE, in *Geography*, a city of Naples, which, though not the capital, gives name to the county or district to which it belongs; 48 miles N.N.E. from Naples. N. lat. 41° 39'. E. long. 14° 25'.

MOLISE, County of, a province of Naples, having N. Abruzzo Citra, E. Capitanata, S. Lavora, and W. those which were denominated the states of the church. Of all the provinces of Naples, this is the smallest, being about 30 miles long, and 24 wide. It is fertile in corn, wine, and saffron, and affords plenty of game and silk. The capital is Campo-basso.

MOLIVO, a sea-port town on the N.W. coast of the island of Metelin, or Mitylene, built on rocks of basalt, precisely on the spot formerly occupied by Methymna: it is commanded by a castle almost in ruins: its population may be estimated at 2 or 3000 inhabitants, as well Turks as Greeks; its territory is formed of a plain of moderate extent, very fertile, and surrounded by volcanic mountains: its productions consist principally of oil, corn, and barley; it furnishes a little wine and various fruits; and also cotton and several kitchen-garden plants; 20 miles N.N.W. of Castro.

MOLL, a town of France, in the department of the Two Nethes, and chief place of a canton, in the district of Turnhout; 10 miles from Harenthals. The place contains 3694, and the canton 15,679 inhabitants, on a territory of 265 kilometres, in five communes.

MOLLARU, a town of Hindoostan, in the circar of Rajamundry; 45 miles N.E. of Rajamundry.

MOLLE, in *Botany*, Clus. Exot. 322. Tourn. Inst. 661, a barbarous name, of Peruvian origin. See *SCHINUS*.

MOLLE, in *Geography*, a town of Norway, in the province of Drontheim. N. lat. 62° 48'. E. long. 7° 36'.

MOLLE, in *Ichthyology*, the name of a small species of whiting, common in the Mediterranean, and in the markets of Rome, Venice, &c. and called by authors the *afellus omnium minium*, and the *merlangus*. It is a species of *Gadus*; which see.

MOLLE, Ital., *Mol*, Fr., *Mollis*, Lat. In the primitive scale of Guido, the sound B, when flat in the hexachord of F, was called *B melle*, sweet, soft, compared with B in the

hexachord of G, when it was called *B-durum*, harsh, and *B-quadro*, square, from the form of the *B*, which was made like a Gothic *B*, or rather *b* for half; a character still retained by the Germans for *B* natural. In solmifation, *B-durum* implies more than *B ♯*, and *B molle*, *B b*.

MOLLER, HENRY, in *Biography*, a learned German Lutheran divine in the sixteenth century, was born at Hamburg in the year 1530. He officiated some time as pastor to a church in the landgraviate of Hesse with great reputation, and was honoured with the degree of doctor of divinity. He was much celebrated for his skill in biblical literature, and he particularly excelled in the knowledge of the Hebrew and Chaldee languages. During fourteen years he filled the chair of professor of the Greek and the Oriental languages in the university of Wirtemberg, of which he was probably deprived for refusing submission to the famous "Form of Concord." He died at Hamburg in 1589, in the sixtieth year of his age. He was author of "Commentaries" on the book of Psalms, and the prophecy of Isaiah. He was likewise known as a poet. Moreri.

MOLLERUSA, in *Geography*, a town of Spain, in Catalonia; 10 miles E.N.E. of Lerida.

MOLLIDON, a town of Hindooistan, on the Doob; 18 miles N.N.W. of Etaya.

MOLLIENS-VIDAME, a town of France, in the department of the Somme, and chief place of a canton, in the district of Amiens. The place contains 836, and the canton 12,456 inhabitants, on a territory of 232½ kilometres, in 29 communes.

MOLLINARI, SIMONE, in *Biography*, was maestro di capella del Duomo at Genoa, and published, in 1605, "Concerti Ecclesiastici," as they are called; but these, which are in Dr. Aldrich's Collection of Music in Christ-church, Oxon, were only masses and motets, accompanied by instruments, which, about this time, became very common in Italy.

MOLLIS PORTIO. See PORTIO.

MOLLITIES OSSIUM. This curious and extraordinary disease may be defined to be a morbid softness and flexibility of the bones, arising from a deficiency of the phosphat of lime in their structure. Whether their firmness and stability are lost, in consequence of this matter being too abundantly absorbed, or of its not being duly and sufficiently secreted, is a question which we cannot undertake to resolve. Some writers treat of the mollities ossium with rickets; but although it is true, that, in both these diseases, the bones lose their natural solidity and proper shape, it appears to us that the two affections deserve a marked distinction, inasmuch as rachitis is an affection peculiar to childhood, and the bones only change their shape gradually; whereas the mollities ossium has frequently been observed to afflict adults, and occasion such a softness of the bones, that, in the extreme stage of the disease, they may be at once bent in any direction whatsoever.

The following case, drawn up by Mr. Gooch, will serve to impress the reader with an idea of the disorder: "Mary Hayes, of Stoke-Holy-Crofs, near Norwich, in Norfolk, was born January 11, 1718, had never been married, and always lived a regular, temperate life. Her father was unhealthy, but it is not known to what disease he was subject; her mother was healthy, and she herself was always looked upon as a strong healthy girl, till about fifteen years of age, when she fell into the green sickness, and took various medicines to no purpose. She had no other complaints till October, 1748, when she was seized with pains, universally attended with feverish symptoms; and thus she continued some weeks, after which the pain was chiefly confined to her legs and thighs, but not increased by external pressure.

"She broke her leg in June, 1749, as she was walking from her bed to her chair, without falling down, and heard the bones snap. The fracture was properly treated by one of the ablest surgeons, and due regard had to her indisposition. No callus was generated; but in a few months the bones grew flexible, from the knee to the ankle. Those of the other leg and thigh were visibly affected soon afterwards, in the like manner; and both legs and thighs then became œdematous, and subject to be excoriated, discharging a thin yellow ichor. About this time," says Mr. Gooch, "I first saw her with the surgeon who had the care of her.

"The winter after breaking her leg she had symptoms of the scurvy, and bled much at the gums.

"Many eminent physicians prescribed for her, but without any effect, unless the regularity of her menstruation, for the last eighteen months, be ascribed to chalybeate medicines, which were part of their prescriptions; though the same kind of medicines were formerly prescribed, and long continued, without having that effect, even when she was in a condition to take exercise.

"About a year before her death she was removed to the parish she belonged to, where I had an opportunity of visiting her often, and observing the progress of her disease. She told me she had found but little alteration of her complaints in general, for some time past, and thought her appetite and digestion rather mended. She breathed with difficulty, and her thorax appeared so much straightened, as necessarily impeded the expansion of the lungs. Her spine was much distorted, and any motion of the vertebræ of the loins excited extreme pain. Her legs and thighs being quite useless, she was confined to her bed in a sitting posture. The bones she rested upon, having lost their solidity, were much spread, and the ends of her fingers and thumbs, by frequent efforts to raise herself, were become very broad, with a curvature of their phalanges. *She now measured but four feet, though before this disease she was five feet and a half high, and well shaped.*

"From this time," says Mr. Gooch, "I observed the flexibility of her bones became gradually more general, and the difficulty of breathing increased, with a wasting of her flesh. For the last four months of her life she had a total suppression of the menstrual discharge, and a great tendency in her legs to mortify, which had long been anasarcaous, and excoriated almost all over. She retained her senses perfectly to the last, and but a few minutes before she died, talked concerning her miserable condition and approaching end, in a very rational and composed manner, with her nurse, who perceived no signs of the change which was just at hand; then reclined her head, and expired instantly without a groan.

"Two days after her death, which happened on Feb. 6, 1753, her limbs being first well stretched out, she was measured, and found wanting, in her natural stature, two feet and two inches! I opened the abdomen and thorax, removing the sternum entirely, with some portion of the ribs, in order to gain at once a full view of those cavities, and to observe how the viscera contained in them had obstructed each other in their respective functions, as well as to inspect the state of them. The heart and lungs were found, but flaccid, and much confined in their motion, to which the enormous size of the liver contributed in some measure, extending quite across the abdomen, and bearing hard against the diaphragm, &c. The lungs did not adhere to the pleura, nor was the liver scirrhus; it was faulty only in its bulk. The mesentery was found, except one large scirrhus gland in it. The spleen was extremely small. Nothing else was found observable in these cavities.

"All her bones, except her teeth, were more or less affected, and scarcely any would resist the knife. Those of the head, thorax, spine, and pelvis, were nearly of the same degree of softness. Those of the lower extremities were much more dissolved than those of the upper, or of any other part. They were changed into a *parenchymous* substance, like soft dark-coloured liver, without the least offensive smell. I cut through the whole length, without turning the edge of the knife, and found less resistance than firm muscular flesh would have made, meeting only here and there with bony laminæ, as thin as any egg-shell.

"Those bones were most dissolved, which, in their natural state, are most compact, and contain most marrow in their cavities, &c."

Mr. Gooch further acquaints us, that the periosteum was rather thicker than ordinary; the cartilages thinner, but no where in a state of dissolution like the bones. He shewed specimens of the dissolved bones to sir John Pringle, in London, and then sent them to Dr. Hunter, who occasionally exhibited them in his anatomical lectures.

Mr. Gooch also sent some of the same substance to an ingenious chemist, desiring him to analyse it; the latter "could discover neither acid nor alkali prevailing in it; but that it contained near seven-eighths of an oleaginous substance, with a small portion of earth."

July 1753, Mr. Gooch saw a similar case to this in a woman, aged twenty-five, in the workhouse at Norwich, under the care of Mr. Swift, an ingenious man, and a very able surgeon. In this example, the ribs, having become exceedingly soft, "fell (to use Mr. Gooch's words) with the sternum flat upon the lungs," and obstructed respiration to such a degree, that when this gentleman saw her, she lay panting for life. In the other case, of which the narrative is given above, the ribs and sternum turned outwards, and the respiration was not quite so much obstructed.

Cases of the mollities ossium are recorded in the Philosophical Transactions; Mém. de l'Acad. Royale des Sciences; Act. Hafniens; German. Ephem. Forestus and Saviard have also detailed cases of the same disease; and a most remarkable example was published by Morand, at Paris, in 1752.

The causes of this singular disorder have hitherto baffled investigation. In the famous case of Madame Supiot, the patient had been in the habit of eating an extraordinary quantity of salt, and this circumstance was immediately suspected as the cause of the disease; yet, in other cases, the immoderate use of salt could not fall into suspicion, and Madame Supiot herself certainly continued to grow worse and worse, long after she had relinquished the custom of taking so much salt with her victuals. We are, therefore, justified in concluding that the eating of this substance had nothing to do with the production of the disease. Were salt capable of having this effect, sailors and others, who live so much on salted provisions, ought frequently to be afflicted with mollities ossium; yet this does not appear to be the fact.

With regard to the treatment, it does not appear that any successful method has been discovered. The deficiency of the phosphat of lime in the structure of the affected bones, has led to the suggestion of exhibiting this substance as a medicine. This may easily be done; but how to make the fecerning arteries deposit it in the bones is a more baffling consideration. We know of no cases, in short, exemplifying the efficacy of this plan, though it is both rational and free from danger.

Madder, from its known property of tinging the bones red, has been supposed to have a particular action on the

osseous system; but, says Boyer, it is now well ascertained, that it has no greater effect in rickets (which is a disease at all events analogous to mollities) than any other bitter plant. *Malad. des Os*, tom. ii.

MOLLUGO, in *Botany*, a name in Pliny, book xxvi. chap. 10, which he indicates as belonging to a plant rough both in foliage and flavour. Linnæus retains it for a genus of a smooth and tender habit, to which, if derived from *mollis*, it would be most suitable.—Linn. Gen. 42. Schreb. 58. Willd. Sp. Pl. v. 1. 491. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 184. Juss. 300. Lamarck Illustr. t. 52. Michaux Boreali-Amer. v. 1. 77. Gærtn. t. 130.—Class and order, *Triandria Trigynia*. Nat. Ord. *Caryophyllea*, Linn. Juss.

Gen. Ch. *Cal.* Perianth inferior, of five oblong, slightly spreading, permanent leaves, internally coloured. *Cor.* none. *Stam.* Filaments three, bristle-shaped, shorter than the calyx, approaching the pistil; anthers vertical, oblong, cloven at the base. *Pist.* Germen superior, ovate, with three furrows; styles three, very short; stigmas obtuse. *Peric.* Capsule ovate, corrugated, of three membranous pellucid valves, and three cells; the partitions from the middle of each valve. *Seeds* numerous, roundish-kidney-shaped, polished.

Ess. Ch. Calyx of five leaves. Corolla none. Capsule of three cells and three valves. Seeds numerous.

1. *M. oppositifolia*. Opposite-leaved Mollugo. Linn. Sp. Pl. 131. (*M.* n. 53; Linn. Zeyl. 21. Jeonpala; Herm. Zeyl. 4. *Alfinc spergulae facie Bengalensis, foliis angustis ad genicula binis, flosculis autem plurimis ad caulem radiatis, semine minutissimo fulvo*; Pluk. Phyt. t. 75. f. 6.)—Leaves opposite, lanceolate. Branches alternate. Flower-stalks lateral, several together, single-flowered. Native of Ceylon. Linnæus describes it as "an annual herb, with long, diffuse, smooth, alternate branches. Leaves opposite, lanceolate, smooth, running down into footstalks. Flower-stalks several, axillary, equal, capillary, single-flowered. Calyx of five leaves."—Plukenet's figure, quoted at the suggestion of Burmann, answers pretty well to this description; and though it has the aspect of an *Hedyotis*, the inferior calyx, proper to *Mollugo*, is sufficiently indicated. According to Hermann this herb is eaten in salads by the vulgar.

2. *M. striata*. Close-leaved Mollugo. Linn. Sp. Pl. 131. Burm. Ind. 31. t. 5. f. 3. (*Alfinc multifolia floribunda glabra, ex sinu Bengalensi, foliis subrotundis, flore majore*; Pluk. Almagest. 21. t. 257. f. 2.)—Leaves about four together, lanceolate. Flowers in panicle clusters, drooping. Stem erect, angular.—Native of Java and Bengal. Root fibrous, annual. Stems several, from two to twelve inches high, erect, slender, angular, smooth, bent at the lower joints, leafy. Leaves three, four, or more, at each joint, lanceolate, entire, smooth, of a pale glaucous green, tapering at the base into a sort of footstalk; in starved plants broader and shorter. *Stipulas* in pairs, small, membranous, roundish. Flowers very small, whitish, in long, slender, almost capillary, smooth clusters, collected into slight panicles; the partial stalks bent downward. Capsule roundish, very thin and membranous. Seeds almost black.

3. *M. hirta*. Hairy Mollugo. Thunb. Prodr. 24.—Decumbent. Leaves four together, obovate, hairy. Native of the Cape of Good Hope. Annual. Of this we have no further knowledge.

4. *M. pentaphylla*. Five-leaved Mollugo. Linn. Sp. Pl. 131. (*Alfinc ramosa procumbens quadrifolia, ad radicem polyphylla*; Burm. Zeyl. 13. t. 8. f. 1.)—Leaves obovate; those of the stem four or five at a joint. Panicles cymose, somewhat racemose.—Native of various parts of the East Indies. This differs from *M. striata* in having numerous

Stems spreading circularly, nearly prostrate, and obovate *leaves*. The *flowers* are twice as large, with a tawny hue, at least when dried, and compose more dense, level-topped, forked or cymose *panicles*, whose branches are scarcely racemose, and by no means elongated.

5. *M. nudicaulis*. Naked-leaved Mollugo. (*Alfne foliis ad radicem politis*; Burm. Zeyl. 14. t. 8. f. 2.)—Leaves obovate, all radical. Stems panicled, forked, naked. Flowers four-cleft. Native of Ceylon; *Burmah*; of Sierra Leone; *Afzelius*. Linnæus confounded this with the last, not perceiving that Burmann had figured two very different plants in his *tab.* 8, without numbering them; and he cites t. 8. f. 1, 2. This by an error of the press is become 12, which Willdenow copies. Burmann refers to a wrong synonym in Sloane, but he describes the present species very well, as having all the *leaves* at the root, with very long, radical, *flower-stalks*, and four-cleft *flowers*, all which circumstances distinguish it from the last.

6. *M. Spergula*. Spurrey Mollugo. Linn. Sp. Pl. 131. Burm. Ind. 31. t. 5. f. 4. (*Pharnaceum Mollugo*; Linn. Mant. 561. Willd. Sp. Pl. v. 1. 1508; but not Linn. Sp. Pl. 389, which is well figured in Herm. Lugd.-Bat. t. 21, and from which it appears, by his Mant. 562, Linnæus meant to distinguish the present species, intending probably to have called it *P. Spergula*, *P. Mollugo* being an error of the pen in p. 561.)—Leaves obovate, rough-edged, four or five together. Branches alternate, hairy at one side. Stalks axillary, single-flowered.—Native of the East Indies. *Stems* procumbent, alternately branched, leafy, round, smooth, except a hairy lateral line. *Leaves* four or five at each joint, obovate, spreading, from two lines to half an inch long, rough or toothed at the edge; on short, often woolly, *foot-stalks*. *Flower-stalks* axillary, solitary to each leaf, simple, single-flowered, the length of the leaf. Linnæus describes minute, linear, cloven *petals*, and five barren filaments, alternate with the five fertile ones, all which is hostile to the character of *Mollugo*; and removes this species to *Pharnaceum* at least, if not elsewhere. We merely describe it here to correct the above errors, and as being what he really meant for *M. Spergula*.

7. *M. verticillata*. Whorled Mollugo. Linn. Sp. Pl. 131. Willd. n. 5. (*M. Spergula*; Linn. Syst. Nat. ed. 10. v. 2. 881. *Alfne spergula mariana, latiori folio, floribus ad nodos, pediculis curtis circa caulem insidentibus, calyculis elegantè punctatis*; Pluk. Mant. 9. t. 332. f. 4. *A. erecta pentaphylla, flore albo*; Burm. Zeyl. 13. t. 7. *A. procumbens, gallii facie*; Ehret. Pict. t. 6. f. 3.)—Leaves whorled, spatulate, unequal. Branches alternate, smooth. Flower-stalks shorter than the leaves, single-flowered.—Native of Virginia. Cultivated in the English gardens in 1748, when Ehret delineated it. This species is a hardy annual, flowering from June to August. The *stems* are prostrate, smooth, much branched, and widely spreading. *Leaves* obovate, acute, entire, smooth, tapering into a footstalk; their length from half to one and a half inch. *Flower-stalks* several together, lateral, not axillary, capillary, deflexed, much shorter than the leaves. *Seeds* very prominent through the capsule, marked with dorsal furrows.

The botanical history of this genus is so confused, that though we have cleared it up in some degree, with the necessary assistance of the Linnæan herbarium, we are by no means certain that nothing more remains to be done. The species require to be confronted throughout with those of *Pharnaceum*, a genus scarcely differing but in number of itaments, the most trivial of all possible characters in this tribe. See PHARNACEUM. S.

MOLLUSCA, in *Natural History*, the name of the se-

cond order of the Linnæan class of Vermes; and it includes animals that are naked; and furnished with tentacula or arms: for the most part they are inhabitants of the sea; and by their phosphorescent quality illuminate the dark abyss of the waters. (See LUMINOUS Animals.) This order, which comprises simple animals furnished with limbs, is separated into distinct divisions, classed according to the situation of the mouth, and the structure of the body; thus:

In division A the mouth is placed *above*; this division includes the following genera:

Aëtinia,	Mammaria,
Afcidia,	Pedicellaria,
Clava,	Salpa.
Dagylia,	

In division B the mouth is placed *before*; and in this are the

Derris	and	Pterotrachea.
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In division C the mouth is placed *before*; and the body has a lateral perforation. In this there are four genera, *viz.* the

Doris,	Limax,
Laplytia,	Tethys.

In division D the mouth is *before*; but the body is furnished with feelers on the fore-part. There are two genera only, *viz.*

Ictothuria	Terebella.
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In division E the mouth is *before*; and the body furnished with arms. Of these there are seven genera, *viz.*

Clio,	Scyllæa,
Lernæa,	Sepia,
Lobaria,	Triton.
Onchidium,	

In division F the mouth is *before*; and the body furnished with peduncles or feet. In this there are the following five genera:

Amphitrite,	Nereis,
Aphrodite,	Spio.
Nais,	

In the last division G, the mouth is placed *beneath*; and generally central. There are five genera in this, *viz.*

Asterias,	Medusa,
Echinus,	Physophora.
Lucernaria,	

See VERMES.

MOLLUSCUM, in *Medicine*, an appellation applied by Dr. Willan to a singular cutaneous disease, of which there are not many cases recorded. It consists of numerous soft tubercles, containing an atheromatous matter, which are of various sizes, from that of a vetch to that of a pigeon's egg, and of different forms, some being sessile, and some attached by a neck. It is not uncommon to meet with one or two of these mollusca; but the singularity above alluded to is, that they sometimes grow all over the surface of the body, and that without any disorder of the general habit. They have no tendency to ulceration or suppuration, but continue permanent through life, having apparently no natural termination. The knife or ligature might be employed for the removal of those which are attached by a peduncle; but the great number of these, independently of those which are sessile, deters from the attempt.

MOLMAN, in our *Old Writers*, a man subject to do service. It is applied to the servants in a monastery.

MOLMA-

MOLMASECA, in *Geography*, a town of Spain, in the province of Leon; 20 miles W. of Astorga.

MOLMUTIN, or **MOLMUTIAN LAWS**, the laws of Dunwallo Molmutius XVI. king of the Britons, who is said to have begun his reign four hundred and forty years before the incarnation.

He was the first who published any laws in this land; and they continued famous therein till the time of William the Conqueror.

MOLNPA'TTY, in *Geography*, a town of the island of Ceylon; 18 miles N.W. of Trincomalee.

MOLOCH, in *Mythology*, the chief and peculiar deity of the Ammonites, who are said, by Vossius and others, to have worshipped the sun under this appellation, and to have sacrificed their children to him. In the scripture it is frequently asserted that the "Ammonites passed their seed through fire unto Moloch." As to the meaning of this expression there is a considerable disagreement among ancient and modern authors. The Jewish writers very generally maintain, that the children were merely carried or led between two fires, by way of purification; whereas the Christian writers have been of opinion, that they actually burnt their children by way of sacrifice to this grim idol. Near Jerusalem there was a place in which this horrid custom was observed; it was called the valley of the sons of Hinnom, so named, as it is said, from the shrieks of the children that were sacrificed; and also Topheth, from a Hebrew word "toph," signifying a drum or tabret, which they used, among other instruments, to drown the dreadful outcries of the unhappy victims. The Canaanites in general were, in the days of Moses, become incorrigible idolaters, and they are accused of offering human sacrifices to Moloch. See the passage above cited from Levit. xviii. 21. From them this detestable worship was transmitted to their descendants the Phœnicians; and as the Carthaginians were a colony that came from Phœnicia, the first gods of Carthage were the same as those who were adored at Tyre and Sidon. The latter people are known to have worshipped Saturn, and Saturn was the same with Moloch, to whom they sacrificed their children. Moloch was represented among the Ammonites under the monstrous figure of a man and a calf. About the feet of the statue were constructed several furnaces, into which they threw the children whom they offered up to that god, and their cries were drowned, as we have already observed, by drums and other musical instruments. Who this Moloch was, has been a subject of various conjectures. Some say that he was the same as Priapus; others assert that he was the sun; but the most common opinion has been, that he was the same with Saturn; and as Saturn is thought to have been Abraham, it has been concluded that the worship of Moloch was formed upon the imperfect accounts which the pagans had collected concerning that ancient patriarch; and that all the circumstances of the sacrifices offered to Moloch were expressive of Abraham's adventures.

MOLOCHATH, in *Ancient Geography*. See **MULUCHA**.

MOLOCHI, in *Geography*, a town of Naples, in Calabria Ultra; three miles N.E. of Oppido.

MOLOCHITES, in *Natural History*. See **MALACHITES**.

MOLODIVE, in *Geography*, a town of the island of Ceylon, on a tongue of land separated by a narrow channel from the E. coast; 46 miles N. of Trincomalee.

MOLOGA, a town of Russia, in the government of Jaroslavl, at the union of the river Mologa with the Volga; 65 miles N.W. of Jaroslavl. N. lat. 58°. E. long. 38° 22'.

MOLOPS, a word used by some medical writers to express the purple spots which appear upon the skin in malignant fevers.

MOLOS, in *Geography*, a town of Arabia, in the province of Yemen; 16 miles N.N.E. of Jerim.

MOLOSSES, **MOLASSE**, or *Melassé*, that gross, yet fluid matter remaining of sugar, after refining, and which no boiling will bring to a consistence more solid than that of syrup; hence also called *syrup of sugar*.

In the manufacture of sugar in the West Indies, the molasses, not improperly called the treacle of sugar, is obtained by the following process. The curing-house, which is a large airy building, is provided with a capacious molasses cistern, the sides of which are sloped and lined with tarras or boards. Over this cistern there is a frame of massy joist work without boarding. On the joists of this frame empty hogsheds without headings are ranged. In the bottoms of these hogsheds eight or ten holes are bored, through each of which the stalk of a plantain leaf is thrust, six or eight inches below the joists, and which is long enough to stand upright above the top of the hoghead. Into these hogsheds, the mass from the cooler is put, which is called *potting*; and the molasses drains through the spongy stalk and drops into the cistern, from which it is occasionally taken for distillation. For other particulars, see the article **SUGAR**; and particularly the method of *claying* sugar.

The term *molasses* has been used to denote the sediment of one kind of sugar called *chypre*, or brown sugar, which is the refuse of other sugars not to be whitened, or reduced into loaves. (See **SUGAR**.) Molasses have been much used in Holland among poor people, for the preparation of tobacco, and also instead of sugar.

MOLOSSES, Artificial. There has been found a method of making molasses from apples, without the addition of sugar. The apple that succeeds best in this operation is the summer-sweeting of a middle size, pleasant to the taste, and so full of juice, that seven bushels will yield a barrel of cyder. The manner of making it is this: the apples are to be ground and pressed, then the juice is to be boiled in a large copper till three quarters of it be evaporated; this will be done with a moderate fire in about six hours, with the quantity of juice above mentioned; by this time it will be of the consistence and taste as well as the colour of molasses.

This new molasses serves to all the purposes of the common kind, and is of great use in preserving cyder. Two quarts of it put into a barrel of racked cyder, will preserve it, and give it an agreeable colour.

The invention of this kind of molasses was owing to Mr. Chandler, of Woodstock, in New England, who living at a distance from the sea, and where the common molasses was very dear and scarce, provided this for the supply of his own family, and soon made the practice general among the people of the neighbourhood. It is to be observed, that this sort of apple, the sweeting, is of great use in making cyder, one of the very best kinds we know being made of it. The people in New England also feed their hogs with the fallings of their orchards of these apples; and the consequence of this is, that their pork is the finest in the world. Phil. Trans N^o 374. p. 230.

MOLOSSES Spirit, a very clean and pure spirit, much used in England, and made from molasses or common treacle dissolved in water, and fermented in the same manner as malt or the common malt-spirit. If some particular art is not used in the making of this, it will not prove so vinous as the malt-spirit, but more flat and less pungent and acid, though otherwise much cleaner tasted, as its essential oil is of a less nauseous flavour. Whence if good fresh wine leys, abounding

in tartar, be duly fermented in the solution made thin for that purpose, the spirit will by that means become much more vinous and brisk, and approach more to the nature of the foreign spirits.

After the first distilling of molosses spirits from the wash into low wines, it is to be rectified, and in the succeeding rectifications proper additions are to be made. Alkaline salts, so common in the rectifying of the malt-spirits, must be avoided in this case, as not at all suiting this spirit, and the neutral ones only must be used, such as sandiver, common decrepitated salt, sal enixum Paracelsi, and the like; but upon the whole nothing so considerable is to be expected from these salts, as from a careful rectification in balneo Mariae, without any other admixture; by this alone repeated two or three times with fresh water each time, the spirit will at once be made fit for the nicest uses.

Where the molosses spirit is brought to the common proof-strength, if it be found not to have enough of the viscosity in it, it will be very proper to add to it some good spiritus nitri dulcis; and if the spirit be clean worked, it may by this addition alone be made to pass on ordinary judgments for French brandy.

When newly distilled, this spirit, like all others, is colourless, and limpid as water; but our distillers always give it the same sort of yellow tinge, which the foreign spirits are found to obtain from the casks in which they are sent over. They have many ways of giving this colour extempore; but the two most in use are, either by an extract of oak-wood, or by burnt sugar.

Molosses spirit being occasionally dearer than that of malt, it is frequently met with basely adulterated with a mixture of that spirit, and indeed seldom is to be bought without some dash of it. Many have a way of mixing malt in the fermenting liquor; by this the yield of the whole is greatly increased, and the maker may assure the buyer that the spirit is pure as it ran from the worm.

England is the principal place where this spirit is made at this time: it was at one time prepared in great quantities in France, especially on the river Loire; but it has been forbidden there under a severe penalty. In Holland also they have it not, on account of the high duty laid upon treacle in favour of their own sugar-bakers.

We meet with very little of molosses spirit reduced to the strength of alcohol or spirit of wine, though, when rectified to this state in a proper manner, it is very little inferior to the real alcohol of wine, the name of which is so well known among us, though the thing itself is perhaps never seen here. All that we call spirit of wine being no other than malt spirit reduced to an imperfect alcohol, or a spirit almost totally inflammable.

Great quantities of molosses spirit are used in the adulterating of brandy, rum, and arrack; and great quantities are used alone in the making of cherry-brandy and other drams by infusion, in all which many prefer it even to the foreign spirits.

In most of the nice cases in our compound distillery, the molosses spirit supplies the place of a pure and clean malt-spirit, which we have not yet the way of producing in the large way to advantage. Our cinnamon, citron, and other fine cordial waters, are made with it; for the malt spirit would give these a very disagreeable flavour.

There is also another use to which this spirit serves extremely well, and in which even a foreign spirit that has any remarkable flavour will not do so well; this is the making of the extemporaneous wine, which some people are so fond of. See *Extemporaneous WINE*.

It gives a yellow stain to the hands, or other substances

dipped into it: and may therefore be of use in dyeing. It is possible also, that the vinegar-makers may find use for it in their way; but the most advantageous of all its uses is to the distiller himself, a quantity of it added to new treacle intended for fermentation will be of great use in the process, and increase very considerably the quantity of spirit; but the proportion in regard to the new matter must not be too great. Shaw's Essay on Distillery.

For the method of extracting spirits from molosses in the West Indies, see the article RUM.

MOLOSSIS, in *Ancient Geography*, an inland province of the ancient kingdom of Epirus; which, according to Scylax, was only 40 stadia, or furlongs, in compass. It derived its name from Molossus, the son of Pyrrhus and Andromache, and contained the following cities, viz. Dodona, (which see,) Passaron, Tecmon, Phylace, and Horreum. See EPIRUS.

MOLOSSUS, in the *Greek and Latin Poetry*, a foot consisting of three long syllables, as *audiri, constabant, virtutem*. It takes its name either from a dance in use among the people called Molossi, or Epirotæ; or from the temple of Jupiter Molossus, where odes were sung in which this foot had a great share; or else because the march of the Molossi, when they went to the combat, was composed of these feet, or had their cadence. The same foot was also called among the ancients, *Vertumnus, extensipes, hippius, & canius*. Dion. iii. p. 475.

MOLRAUZEPOLLAM, in *Geography*, a town of Hindoostan, in the Carnatic; 10 miles N.W. of Madras.

MÖLSEN, or *Hohen MÖLSEN*, a town of Saxony, in Thuringia; 28 miles N.E. of Weimar. N. lat. 51° 10'. E. long. 12° 5'.

MOLSHEIM, a town of France, in the department of the Lower Rhine, and chief place of a canton, in the district of Strasburg; 10 miles W.S.W. of Strasburg. The place contains 2534, and the canton 16,072 inhabitants, on a territory of 167½ kilometres, in 18 communes. N. lat. 48° 32'. E. long. 7 34'.

MOLTA, or MOLTURA, a duty or toll paid by vassals to the lord for grinding their corn at his mill.

MOLTCHANA PIATSKIA, in *Geography*, a town of Russia, in the government of Tobolsk, on the Oby; 80 miles S.S.E. of Narim.

MOLTCHANOVKA, a town of Russia, in the government of Tobolsk, on the Oby; 92 miles S.S.E. of Narim.

MOLTEN GREASE, in the *Manege*. See GREASE.

MOLTER, in *Rural Economy*, the toll taken at a mill. See MOULTER.

MOLTIFAO, in *Geography*, a town of Corsica; 15 miles N. of Corte.

MOLTING, or MOULTING, the falling off or change of hair, feathers, skins, horns, or other parts of animals, happening in some annually, in others only at certain stages of their life. See MOULTING.

The generality of beasts molt in the spring.

The molting of a hawk is called *mewing*.

The molting of a deer is the quitting of his horns in February or March.

The molting of a serpent is putting off his skin. See EXUVIÆ.

MOLTON, SOUTH, in *Geography*, an ancient market and borough town in the hundred of the same name, and county of Devon, England, is situated on an eminence near the western banks of the river Moule, at the distance of 29 miles from Exeter, and 182 from London. Previously to the Norman conquest

conquest it formed part of the royal demesnes. It then came into the possession of private persons; and in the reign of Richard II. reverted to the crown. It was afterwards purchased by the burgessea; and the civil government is now vested in a mayor, eighteen capital burgessea, a recorder, town clerk, and two serjeants at mace. The town was represented in parliament in the thirtieth year of Edward I.; but no return has been made since that period. It is also remarkable for having been constituted an episcopal see, by an act passed the twenty-sixth of Henry VIII.; but it does not appear that any bishop was ordained. The parish church is a spacious structure, and contains several monuments. The guildhall is a convenient fabric; and the market place is extensive and well built. The number of houses was, in the year 1801, returned to parliament as 572, occupied by 2753 persons: of these many derive employment from the manufacture of ferges, shalloons, and felts; and in obtaining lime from the various kilns in the neighbourhood. Provision is made for the education of the children of the more respectable natives, by a well-regulated free-school, founded in 1614, and of those of an inferior class by a charity-school: in the former the late judge Buller acquired the rudiments of that extensive legal knowledge, by which he afterwards became so distinguished. The town has the privilege of six annual fairs, and a weekly market on Saturday.

South Molton was the birth-place of the late Rev. Samuel Badoock, who acquired considerable literary reputation by his critiques on the authenticity of Chatterton's poems, and on other publications. He died in 1788, aged 41.

Between the towns of South Molton and Chumleigh, the Roman station Termolus is supposed to have been situated. It has been conjectured to have been near the junction of the rivers Taw and Mole; but antiquaries have not been able to identify the precise spot. The vicinity affords many remnants of Roman antiquity. Beauties of England and Wales, vol. iv.

MOLUCCA BALM, in *Botany*. See MOLUCCELLA.

MOLUCCA Bean. See BEAN.

MOLUCCA Nuts. See GUILANDINA and BEAN.

MOLUCCA Islands, in *Geography*, islands in the East Indian sea, first discovered by the Portuguese in the year 1510. Strictly speaking, this appellation comprehends only the five following islands, viz. Ternat, Tidore, Motir, Makian, and Bakian or Batchian; but since the kings of the Moluccas have possessed territory in Gilolo, and other adjacent isles, and as the term *Molucca* islands is considered as synonymous with that of *Spice* islands, the appellation has been extended. (See *Spice Islands*.) The Moluccas, properly so called, having been discovered by the Portuguese, afforded to the Spaniards an inducement to make their first circumnavigation under the conduct of Magellan, a Portuguese commander. These two nations for some time contested the right of possessing these islands, till at length they were surrendered to the Portuguese, and from them they were wrested in 1607 by the Dutch. The opulent commerce in these seas was also claimed by the English; and in 1619 a treaty was signed, which declared the Moluccas, as well as Amboyna and Banda, common to both, so that the English were to have $\frac{1}{3}$ d of the produce and the Dutch $\frac{2}{3}$ ds: whilst each of these powers contributed its respective proportion for defending the islands from invaders. But a most atrocious plot was soon framed and carried into execution by the Dutch for rendering themselves independent of all competitors. As each of the islands will be described under its proper appellation, we shall not enlarge here.

MOLUCCELLA, in *Botany*, called *Molucca* by Tournefort, because it was supposed to grow in the Molucca

islands. The name, as Linnæus has altered it, may be tolerated, but it is none of his best.—Linn. Gen. 266. Schreb. 392. Willd. Sp. Pl. v. 3. 128 Mart. Mill. Dict. v. 3. Sm. Prod. Fl. Græc. v. 1. 415 Ait. Hort. Kew. ed. 2. v. 3. 410. Juss. 115. Lamarck Illustr. t. 510. Cærtn. t. 66. (Molucca; Tournef. t. 88.)—Class and order, *Didymia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, very large, turbinate, gradually terminating in a very wide, bell-shaped, toothed or spinous, incurved, permanent limb. Cor. of one petal, ringent, smaller than the calyx; tube and throat short; upper lip erect, concave, undivided; lower cleft into three segments, of which the middle one is most prominent and emarginate. Stam. Filaments four, under the upper lip, two of them shorter; anthers simple. Pist. Germen superior, four-cleft; style in size and situation like the filament; stigma cleft. Peris. Capsule none. Fruit top-shaped, truncated, in the bottom of the open calyx. Seeds four, convex on one side, angulated on the other, broader upwards, truncated.

Obs. *M. spinosa* has the calyx with seven long spines; *M. lævis* has five small ones; and the calyx of *M. frutescens* is furnished with twelve spreading spines. In some species the calyx is longer than the corolla, in others shorter.

Ess. Ch. Calyx bell-shaped, dilated, much wider than the corolla, spinous.

1. *M. spinosa*. Linn. Sp. Pl. 821. Fl. Græc. t. 567, unpublished. (Molucca spinosa; Ger. em. 691.)—Upper lip of the calyx lanceolate, with a very long point; lower rounded, with seven spines. Leaves on stalks, ovate, palmate and cut.—A native of the Levant, and gathered by Dr. Sibthorp on mount Parnassus. It flowers in July and August.—Root annual. Stem about four feet high, erect, smooth, square, purplish, branched at the bottom. Leaves opposite, on longish stalks, strongly veined, smooth, dark green, palmate and cut. Flowers ten or twelve in a whorl, remarkable for the large pyramidal, upper tooth of their calyx, and the many radiating spines of the lower border. Corolla white, its upper lip hairy; palate streaked with purple.

2. *M. lævis*. Linn. Sp. Pl. 821. Fl. Græc. t. 566, unpublished. (Melissa Molucca lævis; Ger. em. 691.)—Calyx bell-shaped, slightly five-toothed; teeth equal, minutely spinous. Leaves on longish stalks, roundish or ovate, toothed.—Native of Syria, and found by Dr. Sibthorp between Smyrna and Bursa. Time of flowering like the last. Root annual. Stems about three feet high, branched, smooth, square, variegated with purple. Branches opposite, smooth. Leaves on long stalks, roundish, deeply notched or toothed, smooth, light green. Flowers axillary, about six in a whorl, the numerous whorls crowded together into a long spike, conspicuous for the rounded, reticulated calyxes which become tawny by age. Corolla white with a lilac tinge, shorter than the calyx.

3. *M. tuberosa*. Willd. n. 3. Pallas. It. v. 3. app. n. 101. t. T.—Calyx funnel-shaped, five-toothed; teeth equal, pointed. Stem-leaves nearly sessile, oblong wedge-shaped, toothed.—Native of muddy places, on hills in the south of Tartary, flowering in May and fruiting in July.—Root perennial, large, composed of two or three ovate knobs, occasionally simple, like a radish, and somewhat bitter. Stem erect, branched, jointed, divaricated, square, smooth, hairy at the joints. Radical-leaves on long rough stalks, ovate, deeply notched; those of the stem almost sessile, wedge-shaped, veined, nearly smooth. Flowers about three or four

four in a whorl, forming a loose spike. *Corolla* bright yellow, twice as long as the calyx.

4. *M. persica*. Willd. n. 4. Burm. Ind. 128. t. 38. f. 2.—Calyx funnel-shaped, five-toothed. Leaves sessile, wedge-shaped, serrated and spinous.—A native of Persia. Willdenow says that Linnæus confounded this species very erroneously with the following, *M. frutescens*, with which however it by no means agrees, except in habit. *Stem* simple, erect, very smooth, hoary, jointed, furnished with simple, long, unequal spines at each joint, generally from five to twelve in number. *Leaves* wedge-shaped, entire at the base, serrated at the end; the serratures terminating in downy spines. *Flowers* in dense whorls. Spinous teeth of the calyx minute. *Corolla* twice the length of the calyx. From Burmann's figure.

5. *M. frutescens*. Linn. Sp. Pl. 821. Fl. Græc. t. 563, unpublished. Allion. Pedem. n. 122. t. 2. f. 2.—Calyx funnel-shaped, five-toothed; teeth spinous. Leaves on short stalks, elliptical, obtuse, slightly five-toothed.—Found by Sherard in Italy, and by Dr. Sibthorp in the isle of Cyprus. *Stem* shrubby, much branched, round or nearly so, with downy branches. Spines at each joint four, awl-shaped, recurved. *Leaves* ovate, downy, on short stalks. *Flowers* axillary, solitary, their stalks about as long as the leaf-stalks. *Calyx* tubular, with five, broad, spinous teeth, nearly equal. *Corolla* scarcely exceeding the calyx, white, with purple streaks on the lower lip. We have separated the last species, which grows in Persia, from this, although professor Martyn is of opinion that they are the same plant; comparison, however, of Dr. Sibthorp's drawing with Burmann's figure shews them to be sufficiently distinct.

6. *M. grandiflora*. Willd. n. 6. (*M. diacanthophylla*; Pallas. Nov. Act. Petrop. v. 10. 380. t. 11.—"Calyx funnel-shaped, five-cleft, its segments pointed. Leaves sessile, in three, deep, cut segments."—Native of Tartary. We have seen neither specimen nor figure of this. Willdenow describes the *corolla* as longer than the *calyx*, its upper lip hairy and cloven.

MOLUCCELLA, in *Gardening*, comprehends plants of the herbaceous annual exotic kind, of which the species cultivated are; the smooth Molucca balm (*M. lævis*); and the prickly Molucca balm (*M. spinosa*).

Method of Culture.—These plants may be increased by sowing the seeds in the early autumn on a mild hot-bed, or in pots plunged into it, and when the plants have attained a little growth be planted in small pots, and placed under a hot-bed frame in winter, where they may have free air in mild weather by taking off the glasses, being carefully covered in frosty weather, keeping them pretty dry, otherwise they are apt to rot. In the spring the plants may be turned out of the pots, with the earth about their roots, and planted in a warm border, defended from strong winds, giving them a little water to settle the earth to their roots; after which they require no other care but to be kept clean from weeds, and be supported with stakes as there may be occasion.

These plants afford ornament and variety in the borders among other tender annual kinds.

MOLUCHES, in *Geography*, a tribe of Patagonians inhabiting the western part of the country. The dead among them are buried in square pits, in a sitting posture, with their weapons and drinking utensils; and an old matron annually opens the grave to cleanse and clothe the skeletons. Around are those of the slain horses, supported with props. The language of the Moluches is more copious and elegant than could have been expected, the verbs having three numbers, and as many tenses as the Greek. See **PATAGONIA**.

MOLUTA ARMA. See **ARMA**.

MOLWITZ, in *Geography*, a town of Silesia, in the principality of Brieg; three miles from Brieg.

MOLY, in *Botany*. See **ALLIUM**.

This plant is supposed to have been wild rue, whose root is black, and the flower white, whence Ovid (*Met.* l. 14.) says:

"Pacifer huic dederat florem Cyllenius album,
Moly vocant superi, nigra radice tenetur."

According to Homer, Mercury gave this plant to Ulysses, by which he had evaded Circe's charms, the meaning of which is said to be, that he was thus taught to recover himself from his remissness, and to give counsel to his companions to quit so dangerous an abode. This plant, so difficult to be found, according to Homer, is the prudence which Ulysses exerted in extricating his soldiers from the seat of voluptuousness; and it may be supposed that all the transformations which Homer, Ovid, and the other poets say this princess wrought, were rather the effects of her charms and beauty than of her magic, though Horace (*1 Epist.* 2. 23.) leads us to understand, that they were the potions which she administered that produced these wonderful effects.

MOLYBDÆNA, **LEADWORT**, a name given by some authors to the great toothwort, or dentillaria of Rondeletius. See **TOOTHWORT**.

MOLYBDENUM, in *Chemistry*, a simple oxydable body and a metal. It is obtained from a blueish-black substance, which, till the experiments of Scheele, was confounded with plumbago. Like the latter substance, it has considerable lustre, feels as if it were greasy, and soils the fingers, but not to the same degree with plumbago.

Scheele found this substance to consist of sulphur and a white powder, which possessed acid properties, and which he denominated the *acid of molybdæna*.

Bergman was the first who suspected this acid to be the oxyd of a metal. He accordingly requested Hielm in the year 1782 to make some experiments with a view to determine this fact. This experimentalist mixed the acid of this metal with linseed oil into the form of paste. This was exposed in a close crucible, lined with charcoal, to a very strong heat. By this means he succeeded in reducing the metal.

In order to obtain it in greater purity, he first roasted the ore to expel the sulphur, which reduced it to the state of powder. This powder being made very fine, he next dissolved it in ammonia, filtered the solution, and then evaporated it to dryness. By boiling this residuum with nitric acid he obtained a white powder, which was the molybdic acid. This being mixed with oil, and treated as before, afforded the metal in small grains.

This metal is so very infusible, that it has hitherto not been obtained but in small granulated bits. On this account we know very little of its physical properties. Its metallic nature, however, has been clearly made out, by the additional labours of Pelletier, Heyer, and others.

It is said to be of a greyish-white colour, possessing metallic lustre. Its specific gravity is supposed to be about seven.

We are indebted to Mr. Hatchett for some experiments upon the oxyds of this metal. He found it capable of four stages of oxydation; namely, the black, the blue, and the green oxyds, besides the white, which is the acid. These different oxyds, it appears, have been obtained by abstracting oxygen from the acid. The black is procured by heating the acid in contact with carbon, and the blue by a longer continuation of the same process. The latter is also obtained

tained by immersing a plate of tin into a solution of the acid.

The acid is obtained by distilling nitric acid two or three times from any of the oxyds of this metal. The proportions of oxygen in molybdenum have not been ascertained, and till then we cannot, with much certainty, rely upon the number of its oxyds.

Molybdenum combines with sulphur. Indeed its native ore is a sulphuret. It is singular that we have no accurate analysis of the native sulphuret, as it might lead to some knowledge of its other compounds. It readily combines with sulphur, and forms a substance similar to the native sulphuret.

If the acid be heated with sulphur in a close vessel, such as a retort, part of the sulphur combines with the oxygen and forms sulphurous acid; the remainder combines either with a lesser oxyd, or with the metal forming a sulphuret. Molybdenum combines with phosphorus, but the compound has not been examined.

Helm, who first reduced this metal, has succeeded in alloying it with many of the other metals. He combined it with gold, platinum, silver, copper, iron, tin, nickel, zinc, lead, and some others. None of these alloys, however, appear to be important, they are almost all of them brittle.

MOLYBDIA, in *Natural History*, the name of a genus of crystals. The word is derived from the Greek *μολυβδος*, lead; and expresses crystals altered in their figure by particles of that metal. The crystals of this genus are of a cubic form, or composed of six sides, at right angles, like a dye. Of this genus there are three known species.

MOLYBDIC ACID, in *Chemistry*. This substance, to which we have already alluded, is arranged among the rest of the acids. Scheele, as has appeared under the account of the metal, was the discoverer of this acid. We are indebted for additional facts relative to this substance, to Hatchett and Bucholz. It may be prepared by boiling nitro-muriatic acid upon the sulphuret for some time; or, by distilling this acid repeatedly from it, a white powder will be formed, mixed with sulphuric acid. This latter, being washed away, will leave the molybdic acid tolerably pure. Another method has been given by Bucholz. He directs the ore to be reduced to fine powder, and roasted at a red heat, gradually lowering the temperature, and stirring it frequently, to keep the powder from adhering. This powder is of a grey colour, and contains a considerable portion of the acid oxyd. This is digested with soda or ammonia, which takes up the molybdic acid. It is remarkable, that molybdats of potash and soda are colourless. May not the colour above-mentioned arise from abstraction of oxygen? For these facts we are indebted to Mr. Hatchett.

This acid forms insoluble salts with many of the metals. Hence it precipitates mercury, copper, lead, &c. from their solutions.

Tin filings change this acid into the blue oxyd, by abstracting some of its oxygen.

Bucholz has attempted the analysis of this acid. He digested 100 grains of molybdenum with nitric acid, till the whole was converted into molybdic acid, which weighed 140 grains. He, therefore, concluded that the acid consists of 100 of the metals, and 40 of oxygen, which gives in the 100, 67.1 of metal, and 32.9 oxygen. If the acid be the fourth oxyd of molybdenum, we may form some idea of the other oxyds, and the rest of the compounds of molybdenum. If we take the acid at 33 *per cent.* of oxygen, and

put the weight of the atom of molybdenum equal x , then

$$\frac{x}{4 \times 7} = \frac{67}{33}, \text{ and } x = 57 \text{ nearly.}$$

Hence for the protoxyd $\frac{57 + 7}{14} = \frac{100}{11}$, or 11 *per cent.*

nearly. The second oxyd $\frac{57 + 2 \times 7}{14} = \frac{100}{20}$, or nearly 20

per cent. From these data, the third will contain 27 *per cent.* of oxygen. From the same reasoning, taking the atom of sulphur at 13, the first sulphuret will contain from 18 to 19 *per cent.* of sulphur.

MOLYBDOMANTIA, *Μολυβδομαντία*, in *Antiquity*, a species of divination, by observing the motions, figures, &c. of melted lead.

MOLYN, PETER, in *Biography*. See TEMPESTA.

MOLYNEUX, WILLIAM, an excellent mathematician and astronomer, was born at Dublin in the year 1656. As his constitution was naturally very tender, he was not sent to school, but instructed in the elementary parts of learning by a private tutor at home. At the age of fifteen he was entered at Trinity college, in his native city, where he distinguished himself for the vigour of his abilities, and the exemplariness of his manners; and having made a remarkable progress in academical learning, he was admitted to the degree of B. A. From Dublin college he went to London, and was entered a student of the Middle Temple in 1675. Here he spent three years, and obtained as much law as was necessary for a gentleman who did not intend to follow it as a profession. The bent of his genius led him to devote much of his time to mathematical and philosophical pursuits, and he returned to his native country in 1678, where he married, and continued to prosecute such branches of natural and experimental philosophy as were most agreeable to his taste. Being much attached to the principles of astronomy, he began, in 1681, to make observations, and commenced a literary correspondence with Mr. Flamsteed, the astronomer-royal of London. Shortly after this, he projected the design of establishing a Philosophical Society in Dublin, in imitation of the Royal Society, that had been but a few years established in London under the auspices of the king. Sir William Petty accepted the office of president, and our author was appointed the first secretary. The meetings of the society were held weekly, and by means of them Mr. Molyneux's scientific reputation became widely extended, and procured him the esteem of persons of the highest rank, and, among others, of the duke of Ormond, then lord-lieutenant of Ireland, to whose influence he was chiefly indebted for his appointment, jointly with sir William Robinson, to the offices of surveyor-general of the king's buildings and works, and chief engineer. In 1685, he was elected fellow of the Royal Society at London, and in the same year, for the purpose of improving himself in the art of engineering, he obtained an appointment to view the most considerable fortresses in Flanders. In the course of his tour he was introduced to Cassini, and the other celebrated astronomers, in the places through which he passed. Upon his return, in 1686, he published his "*Sciothericum Telescopium, or A new Contrivance of adapting a Telescope to an horizontal Dial, for observing the Moment of Time by Day or Night.*" In 1687, when sir Isaac Newton's "*Principia*" first appeared, he expressed his astonishment at such an effort of human intellect, at the same time modestly doubting if he should be able to comprehend all its parts. He was, per-

haps, one of the first who was anxious to apply the principles, discovered in the book, to the practical purposes of religion: "One observation," says he, "is truly to be wondered at, and that is, the *sesquialtera ratio* between the periods and distances of the planets, and that not only among the primary erratics, but even among the lesser sets of dancers.—It is, in my opinion, an amazing thought to consider how universally this great law runs through the whole frame of nature, and agrees to bodies at such vast distances, and that seem to have no tie or respect to each other. It is to me, beyond exception, the strongest argument that can be drawn from the frame of the universe, for the proof of a God, to see one law so fixed and inviolable among those vast and distant *Chori*, who certainly could not therefore be put into this posture and motion by chance, but by an omnipotent intelligent Being." In 1688, owing to the confusion that existed at that period, the Philosophical Society of Dublin was broken up and dispersed; after Mr. Molyneux had distinguished himself by the communication of several papers upon curious subjects, some of which were sent to the Royal Society at London, and printed in their Transactions. During the following year, he, in common with a number of other Protestants, withdrew from the disturbances in Ireland into England. Mr. Molyneux, after a short residence in the metropolis, settled with his family at Chester, where he employed himself in arranging and correcting the materials which he had before prepared for his Dioptrics. The work was published in 1692, under the title of "Dioptrica Nova, A Treatise on Dioptrics, in Two Parts, &c." He gave it the title *Nova*, because it was almost entirely new, very little being taken from other writers, and because it was the first book that had appeared in English upon the subject. It contains several generally useful propositions for practice, demonstrated in a clear and easy manner, and the history of the discoveries made by several optical instruments. In the preface, the author notices the "Essay on the Human Understanding," which, he says, "has rectified more received mistakes, and delivered more profound truths, established upon experience and observation, for the direction of man's mind in the prosecution of knowledge, than are to be met with in all the volumes of the ancients." This compliment proved introductory to an acquaintance between the two philosophers, and a mutual correspondence was carried on by them as long as Mr. Molyneux lived, to whom, it is believed, many improvements in the second edition of Mr. Locke's work are to be attributed. When tranquillity was restored to Ireland, Mr. Molyneux returned, and was elected one of the representatives for the city of Dublin, in the parliament that was convened in 1692. In the following parliament, in 1695, he was chosen representative for the university, and held that seat during the remainder of his life. He was likewise nominated by the lord-lieutenant one of the commissioners of the forfeited estates, with a salary of 500*l. per annum*; but he declined the office, considering it to be an invidious employment. He was a zealous friend to the linen manufactory, and was at all times an open and avowed advocate for the freedom and independence of his country, and in this character he published "The Case of Ireland, stated in relation to its being bound by Acts of Parliament made in England," which is said to contain the substance of all that can be advanced on this very interesting subject, written with great clearness and strength of reasoning. The book was drawn up with great caution; nevertheless, a complaint was preferred against it to the house of commons, who thought proper to address his majesty on

the occasion, asserting the dependency and subordination of Ireland to the kingdom of England. Mr. Molyneux, previously to the publication, had asked the opinion of Mr. Locke concerning the fundamental principle upon which his argument was founded; but this excellent man, instead of answering the letter of his friend, urged him to come to England, that they might talk over the subject together. To this he assented, and spent five of the happiest weeks in his life with Mr. Locke. When they separated, it was with an intention to renew the meeting in the following spring; but ere that arrived, death had deprived the world of Mr. Molyneux, who died in October, 1698, in the forty-third year of his age. He wrote several papers, that are inserted in the Philosophical Transactions, from vol. xiv. to xxix. Many of his letters are preserved in the collection of "Familiar Letters between Mr. Locke and several of his Friends." Biog. Brit.

MOLYNEUX, SAMUEL, the only descendant of the preceding, was born at Chester in the year 1689. He was educated according to the plan laid down by the friend of his father, Mr. Locke. The progress of the child was very rapid, so that he knew more at the age of six or seven, than most children do at double that age. On the death of his father, the care of his education devolved upon an uncle, Dr. Thomas Molyneux, an eminent physician at Dublin, and a friend also of Mr. Locke, who executed the trust reposed on him with honour and fidelity. The young man, improving all the advantages bestowed upon him, became one of the most polished and accomplished gentlemen of his age, and was appointed secretary to the prince of Wales, afterwards king George II. As he was possessed of an ample fortune, he pursued, with great ardour, the sciences of astronomy and optics, and projected many schemes for their advancement. He applied himself to find out a convenient method of manufacturing specula for sir Isaac Newton's reflecting telescope, in which his chief design was to reduce the method of making these instruments to a sort of certainty, in order that the difficulty in constructing them, and the danger of miscarrying, might no longer discourage any workman from attempting to make them for public sale. With the assistance of Mr. Bradley, the Savilian professor of astronomy at Oxford, he succeeded so well, that the whole process, being communicated to a skilful optician, the construction of these telescopes was, afterwards, executed with great readiness and dispatch. His zeal for the improvement of his favourite sciences, induced Mr. Molyneux not only to collect and consider what had been written and practised by others, but also to procure a complete apparatus for the purpose of making new experiments. In the midst of these avocations, which were honourable to him as a philosopher, he was appointed one of the lords commissioners of the admiralty, by which means he became so involved in public affairs, that he had no leisure to promote the interests of philosophy and science. He accordingly gave all his papers to Dr. Robert Smith, professor of astronomy at Cambridge, whom he invited to make use of his house and instruments, in order to finish what he had left incomplete. By the death of Mr. Molyneux, which happened soon after this, the professor was precluded from the benefit of this invitation: he, however, supplied what was unfinished by our ingenious author from Huygens and others, and published the whole in his "Complete Treatise on Optics." Mr. Molyneux married lady Elizabeth, sister to the earl of Essex, but had no children. Biog. Brit.

MOLZA, FRANCISCO MARIA, a distinguished character among the Italian literati, was born in 1489, at Modena.

From

From a very early age he was conspicuous for the readiness and avidity with which he imbibed classical literature: to his knowledge of the Greek and Roman languages, he added that of Hebrew. At the age of sixteen, he was sent to Rome to pursue his studies, but unfortunately he met with bad company, and entered upon a licentious course, which influenced the fortunes of the remainder of his life. To reclaim him, he was married to a Modeste young lady of noble descent, when he had scarcely attained to man's estate, with whom he lived till she had borne him four children. In 1576, he returned to Rome, where he spent almost all the remainder of his life. Study and pleasure seem alternately to have occupied all his thoughts. Among the many objects of his transitory attachments, is mentioned Furnia, a Roman courtesan, of whom he was so much enamoured, that it has been said he assumed the surname of Furnius on her account; but as his own mother's family name was De Forni, he probably derived the additional appellation from that. By these amours, he did serious injury to his reputation, and was once brought into the most imminent danger from the hand of an assassin; and he finally contracted a disease, the consequence of illicit connections, which brought him, as it has thousands, and tens of thousands of the votaries to pleasure, to a miserable end. From the year 1529 to 1535, Molza was at Rome in the court of cardinal Ippolito de Medici; after whose death, and the elevation of Paul to the papedom, he removed to that of cardinal Farnese. The profligacy of his conduct was no obstacle to an intimacy with many men of letters, such as Bembo, Sadoleto, Colocci, &c., and he was regarded as one of the principal ornaments of the literary academies then flourishing in that capital. His compositions were chiefly poems both in Italian and Latin, and on topics of all kinds, moral and serious, sportive and amorous, in all which he excelled. His elegies are excellent imitations of Tibullus. He was reckoned a powerful orator, and his epistles are graceful and elegant. He died, as we have already hinted, under the most excruciating sufferings, in 1544. Of his works, many were published separately, but no edition of the whole collectively appeared till that of Bergamo, in 1749, to which an account of his life is prefixed by Serassi.

MOLZA, TARQUINIA, daughter of Camillo, the eldest son of the subject of the foregoing article, was born at Modena in 1542. She was instructed in the classics, in Hebrew, and in the belles lettres, and made great progress in every thing which she undertook: she became an adept in some of the abstruse branches of science, and was a proficient in music; but with all these, she was distinguished by the graces and amiable qualities of her sex. She was married, in 1560, to Paul Porrino, but never had any children; and after his death, in 1578, she passed her life in literary retirement at Modena, where she died in 1617. She distinguished herself by her writings, consisting of Latin and Italian poems, and translations from Plato, and other classics. Her remains were printed in the Bergamo edition of her grandfather's works. This lady was the subject of numerous eulogies from contemporary writers; but the most extraordinary honour that she received, was that of being presented with the citizenship of Rome, by the senate and people of that city, in a patent reciting her singular merits, and conferring upon her the title of *Unica*. The honour is extended to the whole noble family of Molza.

MOM, in *Geography*, a town of Arabia, in the province of Hedysas; 5 miles N. of Mecca.

MOMAPANE LAKE, a lake of Canada; 160 miles N. of Quebec. N. lat. 49° 40'. W. long. 71°.

MOMARACKPOUR, a town of Hindoostan, in Bahar;

21 miles N.W. of Chupra. N. lat. 25° 59'. E. long. 84° 38'.—Also, a town of Hindoostan, in Allahabad; 30 miles N. of Gazyppour.

MOMBACA, or MOMBAZA, a kingdom of Africa, near the coast of the Indian sea, south of Melinda, of unknown extent. The soil is very fertile, and produces rice, millet, and other grain, fruit-trees, and vegetables of various kinds; great numbers of cattle and of poultry are bred in this country; and it abounds with excellent springs of fresh water. The climate is temperate, and the air is healthy. The capital, formerly on a peninsula, has been insulated by cutting a canal across the isthmus. The houses are stone, cemented with mortar, and covered with paintings and other ornaments; the streets, though narrow, are straight, and the houses are contiguous, and terraced on the tops. The city is defended by a citadel, which served the Portuguese for a place of retreat, from which, however, they were expelled by an Arabian scheid in 1631; but they regained their possessions in 1729. Before the city is a commodious bay, being both spacious and affording deep water. From this port a considerable commerce is carried on with the neighbouring countries. The inhabitants are various in their complexion; but their dress is after the Arabian fashion. They differ also with regard to religion, as Christians, Mahometans and idolaters, are intermixed; but they are said to be more civil and hospitable to strangers than any others on the same coast. S. lat. 3° 30'.

MOMBEIRA, a river of Africa, in Benguela, which runs into the Atlantic, S. lat. 15° 15'.

MOMBEL, a town of France, in the department of Mont Blanc; 10 miles W.N.W. of Chambéry.

MOMBELTRAN, a town of Spain, in Old Castile; 27 miles S.S.W. of Avila.

MOMBRIZO, BONINI, in *Biography*, an Italian man of letters in the 15th century, was born at Milan, and became professor of eloquence in that city. He was author of several works, which were well received, and among others some Latin poems, particularly one "On the Sufferings of Jesus Christ." His chief performance is entitled "Sanctuarium, five acta vitæ Sanctorum," in two volumes. For this, it is generally admitted, that ecclesiastical historians are under great obligations to him, as he has drawn from obscurity many important and valuable facts, which, without his researches, would have been lost to the world. Of this work, subsequent writers have availed themselves; but a perfect copy of it is now exceedingly rare, and greatly sought for by curious collectors. Moreri.

MOMDSONA, in *Geography*, a town of Thibet; 9 miles S. of Lassa.

MOMEGASTRO, a town of Spain, in Aragon; 12 miles E. of Balbastro.

MOMELSDORF, a town of the duchy of Wurzburg; 9 miles N.W. of Ebern.

MOMENT, in *Time*, the most minute and indivisible part of duration; or what we otherwise call an *instant*.

A moment ought not to be conceived as the least part of time, but as a termination or limit of time. Maclaurin's *Fluxions*, vol. i. p. 245.

MOMENTS, in the new doctrine of infinites, denote the infinitely small parts of quantity.

Moments are the same with what we otherwise call *infinitesimals*, and *differences*; being the momentary increments, or decrements of quantity, considered as in a continual flux. Moments are the generative principles of magnitude: they have no determined magnitude of their own; but are only inceptive of it.

Hence, as it is the same thing, if, in lieu of these moments,

the velocities of their increases and decreases be made use of, or the finite quantities proportionable to such velocities; the method of proceeding, which considers the motions, changes, or fluxions of quantities, is denominated, by sir Isaac Newton, the method of fluxions.

Leibnitz, and most foreigners, considering these infinitely small parts, or infinitesimals, as the differences of two quantities; and thereby endeavouring to find the differences of quantities, *i. e.* some moments, or quantities infinitely small, which being taken an infinite number of times, shall equal given quantities; call these moments, *differences*; and the method of procedure the *differential calculus*. See *CALCULUS Differentialis*.

MOMENT, *Momentum*, in *Mechanics*, is the same with *impetus*; or the quantity of motion in a moving body. See **FORCE**.

MOMENTUM is sometimes also used simply for the motion itself. Moment is frequently defined by the *vis insta*, or the power by which moving bodies continually change place. In comparing the motion of bodies, the ratio of their momenta is always compounded of the quantity of matter, and the celerity of the moving body; so that the moment of any such body may be considered as a rectangle under the quantity of matter, and the celerity.

And since it is certain, that all equal rectangles have their sides reciprocally proportionable; therefore, if the moments of any moving bodies be equal, the quantity of matter in one to that of the other, will be reciprocally as the celerity of the latter to the celerity of the former; and, on the contrary, if the quantities of matter be reciprocally proportionable to the celerities, the moments or quantities in each will be equal.

The moment, also, of any moving body may be considered as the aggregate or sum of all the moments of the parts of that body; and, therefore, where the magnitudes and number of particles are the same, and where they are moved with the same celerity, there will be the same moments of the wholes.

MOMENTARY MOTION. See **QUANTITY**.

MOMFLOT, in *Geography*. See **MONFALOUT**.

MOMORDICA, in *Botany*, a name of whose derivation we find no satisfactory account. Linnæus deduces it from *mordeo*, to bite, because, he says, "the seeds seem to have been bitten." But this applies rather to the pulpy fruit, which, in the original species, cracks and flies asunder irregularly, so as to have that appearance. The name was first given to this plant by Castor Durante, and appears to be Italian, having originally belonged to some sort of *Geranium*.—Linn. Gen. 506. Schreb. 662. Willd. Sp. Pl. v. 4. 601. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 380. Juss. 395. Tourn. t. 29, 30. Lamarck Illustr. t. 794. Gærtn. t. 88.—Class and order, *Monocœcia Syngenesia*; or rather *Monocœcia Polyadelphia*; see Sm. Intr. to Botany, 478. Nat. Ord. *Cucurbitaceæ*, Linn. Juss.

Gen. Ch. Male. *Cal.* Perianth of one leaf, concave, in five lanceolate spreading segments. *Cor.* in five deep divisions, united to the calyx, but larger and more spreading, veiny and rugose. *Stam.* Filaments three, awl-shaped, short; anthers on two of the filaments double, or cloven, with two appendages at each side; on the third filament simple, with appendages on one side only, and consisting of a compressed body, with a pollen-bearing line once reflexed.

Female on the same plant. *Cal.* Perianth like that of the male, superior, deciduous. *Cor.* as in the male. *Stam.* Filaments three, very short, without anthers. *Pist.* Germen inferior, large; style one, cylindrical, columnar, three-cleft; stigmas three, tumid, oblong, directed outwards.

Peric. Berry spongy, oblong, separating elastically, of three cells, with soft, membranous, distant partitions. *Seeds* several, compressed.

Ess. Ch. Male, Calyx five-cleft. Corolla deeply five-cleft. Filaments three.

Female, Calyx five-cleft. Corolla deeply five-cleft. Style three-cleft. Berry separating elastically.

1. *M. Balsamina*. Common. or Male, Balsam-apple. Linn. Sp. Pl. 1433. Lamarck Dict. v. 4. 237. Zorn Pl. Med. t. 45. (*Balsamina mas*; Ger. em. 362. *B. mas*, fructu puniceo, and *Momordica fructu lutco-rubefcente*; Besl. Eyst. autumn. ord. 1. t. 4. f. 2, 3)—Fruit roundish-ovate, pointed, angulated and tubercular. Bractea heart-shaped, toothed, above the middle of the flower-stalk. Leaves smooth, five-lobed, palmate, deeply toothed.—Native of the East Indies. A very tender annual in our gardens, kept occasionally for curiosity merely, notwithstanding its reputed vulnerary or balsamic virtues, from whence the specific name arose. The ripe fruit, infused in olive oil, said to possess a tonic and healing quality, is now out of use. The stems are long, weak, slender, smooth, leafy, supported by long, simple, spiral, capillary tendrils, opposite to each leaf-stalk. Leaves alternate, stalked, about two inches wide, of a bright shining green, naked, finely dotted, cut half way down into five, scarcely seven, broad, spreading lobes, with broad, sharp capillary-pointed teeth. Flowers large, yellow, on axillary, solitary, simple stalks, twice the length of the leaf-stalks, and bearing at the top a rounded bract. Fruit about two inches long and one broad, orange-coloured, or almost scarlet, splitting at one side when ripe, and discharging its seeds with some force through the cleft, by means of the elasticity of its coat.

2. *M. Charantia*. Hairy Balsam-apple. Linn. Sp. Pl. 1433. I. Mill. Illustr. t. 83. (*Balsamina cucumerina indica*, fructu majore flovescente; Comm. Hort. v. 1. 103. t. 54. *Amara indica*; Rumph. Amb. book 10. 410. t. 151.)—Fruit oblong, taper-pointed, angulated and tubercular. Bractea heart-shaped, entire, below the middle of the flower-stalk. Leaves seven-lobed, palmate, bluntly toothed, somewhat hairy.—Native of the East Indies. Cultivated by Miller in 1731. It differs from the former in having a much longer fruit, more pointed at each end; leaves usually more deeply palmate, with broader more shallow teeth, their veins very hairy beneath; flower-stalks elongated, rather hairy, bearing their bractea, which is entire, in their lower part.

3. *M. muricata*. Muricated Balsam apple. Willd. n. 3. (*M. Charantia* ß; Linn. Sp. Pl. 1433. Lamarck Dict. v. 4. 239. *M. zeylanica*; Mill. Dict. ed. 8. n. 3. Pavel; Rheede Malab. v. 8. 18. t. 10.)—"Fruit oblong, muricated, taper-pointed. Bractea heart-shaped, nearly entire, below the middle of the flower-stalk. Leaves seven lobed, palmate, toothed, pointed."—Native of the East Indies. The leaves of this are nearly smooth, less deeply lobed and toothed, with taper points. Fruit only an inch and half long, not furrowed, but beset with numerous sharp prominent points.

4. *M. senegalensis*. African Balsam-apple. Lamarck Dict. v. 4. 239. Willd. n. 4.—"Fruit ovate, acute, tubercular. Bractea heart shaped, entire, near the base of the flower-stalk. Leaves seven-lobed, deeply palmate, somewhat toothed, and rather hairy.—Gathered by M. Rouffillon in Senegal. Lamarck. More hairy or downy than *M. Charantia*, the leaves smaller, more deeply lobed; flower-stalks generally longer; fruit shorter, being oval, and not above an inch long, warty; flowers small. Lamarck.

5. *M. operculata*. Covered Balsam apple. Linn. Sp. Pl. 1433. Ait. Hort. Kew. ed. 1. v. 3. 499. Willd. n. 5. (*M. ame-*

MOMORDICA.

(*M. americana*, fructu reticulato sicc; Comm. Rar. 22. t. 32.)—Fruit elliptical, angular, sharply tuberculated, with a beaked lid. Leaves five lobed, toothed.—Native of the West Indies. Sent to Kew, in 1787, by Mr. Alex. Anderson. It is annual like the rest, and flowers from June to September in the stove. The leaves are finely downy, with five shallow spreading lobes. Tendrils divided. Fruit ovate, or obovate, an inch and half long, its angles armed with pointed tubercles, its top a taper deciduous lid, leaving a small orifice, through which the seeds escape, the rest of the fruit when old becoming dry and reticulated.

6. *M. Luffa*. Egyptian Balsam-apple. Linn. Sp. Pl. 1433. (*Cucumis aegyptius reticulatus*, seu *Luffa arabum*; Vessing. Ægypt. 48. t. 50, 51. Petola; Rumph. Amb. book 10. 405. t. 147.)—Fruit oblong, somewhat cylindrical, furrowed, smooth; reticulated within. Male flowers corymbose. Bractea heart-shaped entire, at the base of each partial stalk. Leaves rough, five-lobed, toothed.—Native of the East Indies. Cultivated near Cairo by the Arabs, (who call it *Luffa*.) rather, as it appears, for curiosity than use, the fruit not being eatable. This has the herbage more like some sort of Melon than the rest of the species. The leaves are rough with minute tubercles. Tendrils many-cleft. Male flowers numerous, pale yellow with orange streaks, in a downy corymbus, with small smooth bracteas. At the bottom of their long common stalk stands a solitary stalked female flower, whose long germen is clothed with dense down. The stamens are truly polyadelphous, with large sinuous anthers. Fruit a span long, swelling upwards, smooth, displaying, when the skin is removed, a most elegant reticulated structure, in which the seeds are lodged.—*Luffa sativa*, Cav. Ic. v. 1. 7. t. 9, 10, is evidently nearly allied to this plant, but its stamens are said to be all separate. The angles of the fruit moreover seem to be sharper, and its coat thicker, opening by a lid, as in the last. The tendrils and inflorescence agree with *M. Luffa*, but, as Cavanilles observes, the two plants require to be compared in a living state, especially their stamens. See LUFFA.

7. *M. cylindrica*. Cylindrical Balsam-apple. Linn. Sp. Pl. 1433. Willd. n. 7.—Fruit cylindrical, very long. Bractea heart-shaped, entire, at the base of the flower-stalk. Leaves heart-shaped, angular, toothed.—Native of Ceylon and China. Of this we find no figure. The Linnæan specimen has an angular stem. Tendrils simple, very long. Leaves heart-shaped, finely toothed, rough, angular rather than lobed, on rough stalks. Flowers small, with very hairy stalks and calyx. Fruit, according to Linnæus, a foot long, rather hairy. Seeds black. Flowers yellow.—This seems by Willdenow to be cultivated in Germany, but we have it not.

8. *M. trifoliata*. Three-leaved Balsam-apple. Linn. Sp. Pl. 1434. Willd. n. 8. (*Poppya sylvestris*; Rumph. Amb. book 9. 414 t. 152. f. 2.)—Fruit ovate, prickly. Leaves ternate, toothed.—Native of the East Indies. Distinguished by its ternate leaves, which are smooth on the upper side; the leaflets all equally stalked. Fruit red, the size and shape of a hen's egg, rough with small prickly protuberances.

9. *M. pedata*. Pedate Balsam-apple. Linn. Sp. Pl. 1434. (*M. fructu striato lævi*, vulgò Caigua; Feuill. Peruv. v. 1. 754. t. 41.)—Fruit ovate, striated. Leaves pedate, serrated.—Native of Peru. We have never seen this but in the garden of the Marquis Hippolito Durazzo, at Genoa, in 1787. Feuillée says the Peruvians eat the fruit in their soups, its cooling qualities being peculiarly welcome in that hot climate. The leaves are dark green, rough with callous tubercles, and remarkable for being pedate; their lobes are

pinnatifid, rather than serrated, in our specimens. Flowers small, greenish-yellow; the male ones umbellate; female solitary, at the base of their common stalk. Calyx with long, narrow, acute segments. Germen rough. Fruit, according to Feuillée, about four inches long, greenish-white, spongy, with a sharpish taste. He represents the tendrils as of two or three branches; in our's they are simple. Thus, with the deeply cut leaves, and their callous roughness, not mentioned in his prolix description, makes us fully believe our's may be a distinct species. There is no specimen in the herbarium of Linnæus, as he merely copied Feuillée.

10. *M. lanata*. Woolly Balsam-apple. Thunb. Prodr. 13. Willd. n. 10.—“Leaves ternate, pinnatifid, rough. Fruit woolly.”—Native of the Cape of Good Hope.

11. *M. echinata*. Bristly Balsam-apple. Muhlenb. MSS. Willd. n. 11. (*Sicyos lobata*; Michaux. Boreal-Amer. v. 2. 217.)—Fruit with four seeds, roundish, beset with long bristles. Leaves heart-shaped, roughish, with five sharp angular lobes, obscurely toothed.—Native of Pennsylvania, towards the river Ohio. We have specimens from the Rev. Dr. Muhlenberg. The stem is deeply furrowed, smooth. Tendrils long, divided, not many-cleft. Leaves on long stalks, opposite to each tendril, of a pentagonal figure, with five divaricated, pointed, distantly toothed lobes; heart-shaped at the base, where there is also a small additional lobe, or dilatation, at each side. Both surfaces of the leaves are rough with extremely minute prickles, especially on the ribs and veins, in our specimens, though Michaux and Willdenow describe them as smooth. Flowers small; the males very numerous, in axillary downy panicles, from two to six inches long; females solitary, stalked, at the base of the stalk of the panicle. Germen globose, beset with long weak prickles. Fruit roundish, the size of a gooseberry, likewise prickly, with only four seeds.

12. *M. dioica*. Dioecious Balsam-apple. Roxb. in Willd. n. 12.—“Fruit elliptical, mucicated. Flowers dioecious. Leaves heart-shaped, pointed, toothed.”—Native of the East Indies.—Stem angular, climbing. Leaves heart-shaped, undivided, pointed, toothed, smooth on both sides, two inches long. Tendrils simple. Flowers dioecious; the female ones axillary, solitary. Fruit the size of the first species, elliptical, very thickly beset with sharp tubercles. Willdenow.

13. *M. spicata*. Spiked Balsam-apple. Linn. MSS.—Leaves heart-shaped, slightly three-lobed, wavy, rough. Male flowers in long loose spikes, with fan-shaped, rough, toothed bracteas; female axillary solitary. Germen elliptical, rough.—Of this we find a specimen in the herbarium of the younger Linnæus, under the above name, but without any indication of its native country. The stem is furrowed, slightly prickly. Tendrils, as far as we can judge, simple. Leaves on long rough stalks, opposite to the tendrils, heart-shaped, with three or five slight angular lobes, wavy, rough with minute callous tubercles, the veins hispid. Male flowers in lax, simple, solitary, axillary, long-stalked spikes, each flower accompanied by a large, sessile, fan-shaped, rough bractea, toothed at the summit; female solitary, on a short axillary stalk; its germen elliptical, furrowed, hispid; calyx with a very long tube.—The male inflorescence marks this as a very distinct species, that seems not to be any where described.

14. *M. Elaterium*. Squinting Balsam-apple or Squinting Cucumber. Linn. Sp. Pl. 1434. Bulliard t. 81. (*Cucumis sylvestris*; Camer. Epir. 946. *C. affinis*; Gerem. 912.)—Fruit elliptical, hispid, elastic at the base. Leaves heart-shaped, wavy, rough. Tendrils none.—Native of waste ground in the south of Europe. It is a hardy annual,

annual, now and then allowed a place in curious gardens for the sake of its fruit, which, to the surprise of those who touch it unawares, starts from its stalk with a violent spring, squirting out the seeds by the orifice. The *herb* is a rank, spreading, rough and hairy, rather glaucous, weed, with round thick branches, destitute of tendrils. *Flowers* dull yellow; the males but few together in an axillary cluster, accompanied at the bottom by one female blossom. *Fruit* pendulous, elliptical, blunt at each end, about two inches long, green, rough with innumerable small bristles, of a thick coriaceous texture, without valves.—The extract of this fruit, known by the name of ELATERIUM, (see that article,) is a violent and dangerous purge.

MOMORDICA, in *Gardening*, contains plants of the annual trailing and perennial kinds, of which the species cultivated are, the common momordica, or male balsam apple (*M. balsamina*); the hairy momordica (*M. charantia*); the Egyptian momordica (*M. luffa*); and the elastic momordica (*M. elaterium*).

Method of Culture.—All these plants may be increased by sowing the seeds of the first three sorts upon a moderate hot-bed, in the early spring months, as about March; and when the plants have had a little growth, let them be pricked out into another hot-bed, fresh air being given in fine weather, and water occasionally; or they may be let remain in the first hot-bed till they have acquired sufficient growth, and have four or five leaves, when they should be removed into the hot-bed where they are to remain, one or two plants being put into each light, due shade and water being given till fresh rooted. They afterwards demand the same management as the cucumber kind, the branches being suffered to extend themselves in the same manner. When thus managed, and properly treated, in respect to air and water, they produce fruit and ripe seeds in the latter end of summer, when it must be immediately gathered, to prevent its being dispersed. The plants may likewise be set in pots, and placed in the hot-house, their vines or stems being supported by sticks, in which mode they have a much better appearance and effect.

The fourth sort may be sown or suffered to scatter, where the plants are to remain, or on beds of fine mould in the autumn, the plants being afterwards thinned out, or removed into rows in an open situation, three or four feet apart, and as many distant in them, requiring only the further culture of being kept clean from weeds. Where the soil is dry, they often continue three or four years.

All the sorts afford ornament, the first three sorts in the stove, and the last in the open borders. The fruit of the last also affords a medicinal substance by inspissation.

MOMORDICA, *Stinking*. See BRYONIA.

MOMOT, in *Ornithology*. See RAMPHASTOS *Momota*, and MOMOTUS.

MOMOT *Pheasant* of Latham. See PHASIANUS *Motmot*.

MOMOTUS, in *Natural History*, a genus of birds of the order PICÆ, of which there is but a single species: the generic character is, bill strong, slightly curved, serrate at the edges; nostrils feathered; tail wedged; feet gressorial.

Species.

BRASILIENSIS, or Brazilian Momot. Green; front blueish-green; hind-head violet; crown black. This bird, remarkable for the beauty of its plumage, is a native of South America, and seems to be chiefly found in Brasil, whence it derives its name. It was first described by Hernandez, in his History of Mexico; who says, "It is the size of a dove, and has scarlet eyes, with a black pupil; a crooked blackish bill, almost three inches long, sharp-

pointed, with the lower mandible shortest, and the upper serrated; the head is blue like that of the peacock; the legs and feet brown, and the rest of the bird green; and what is extraordinary, is, that the tail has one quill longer than the rest, and feathered only at the end." This description was regarded by Ray as very inaccurate, and in his edition of Willoughby's Ornithology, he says, "This is, I dare say, more strange than true, for the tails of all birds, I ever yet saw, have their feathers growing by pairs, that is, two of a sort, on each side." Edwards, about half a century ago, described it as a species of Roller, and named it the "Saw-billed Roller." According to this naturalist, "It is short-legged in proportion, and not long-winged; the bill is pretty straight, moderately bending downwards at the point, toothed on the edges like a saw; the upper mandible dusky, the lower flesh-coloured towards its basis; the nostrils are covered with small black feathers, and some black bristles pointing forward round the upper mandible; the upper part and the sides of the bill are encompassed with black, from which run black lines through the eyes, and broader black lists, mixed with a little blue, from the corners of the mouth down the sides of the neck; the top of the head is of an ultramarine blue, though next the bill inclining to sea-green; in the middle of this blue space, on the crown of the head, is a black spot; it has also a spot of black feathers, edged with blue, on the fore part of the neck, a little below the throat; otherwise the whole underside, from the bill to the covert-feathers beneath the tail, is of an olive or greenish buff colour." Other naturalists have given descriptions rather different. Linnæus considered it as a species of the Ramphastos, or Toucan genus, and denominated it "RAMPHASTOS *Momota*;" but Dr. Latham instituted for it a separate genus, the structure of the feet forbidding it to be associated with the Toucans, which have scansorial or climbing feet, having the toes placed two forwards and two backwards, as the parrot genus. Edwards had noticed as a great singularity in this bird, that the two long tail-feathers seem as if they were stripped of their webs on each side for an inch space, a little within their tips; but Latham says, "That though the tail, in many specimens, exhibited the very remarkable particularity described by Edwards, yet in its truly natural, or perfectly complete state, the two middle feathers are entirely webbed throughout their whole length." The momotus is nearly equal in size to a magpie, measuring about eighteen inches in length. It is said to be a bird of solitary habits, frequenting thick woods, and is seen singly. It makes its nest on the ground, sometimes in the deserted hole of an armadillo, or other quadruped; it is composed of dry grass and stalks, and it lays commonly two eggs.

In Gmelin's last edition of Linnæus, there is a variety mentioned, and described as variegated with green, tawny, blue, and cinereous. The body above olive green, beneath rusty; head large; crown blue, black in the middle; bill black, scarcely two inches long; the legs are black, and the claws hooked.

This bird feeds on insects and raw flesh, the fragments of which it macerates in water; when taken it strikes violently with the bill; the voice is harsh, weak, and tremulous. Shaw, Latham. Gmelin's edit. of Linnæus.

MOMPOX, or *Santa Cruz de Mompox*, in *Geography*, a town of South America, in the province of Carthagena, on the left bank of the Magdalena; 110 miles S. S. E. of Carthagena. Mompox, which is a very commercial port, has a royal custom-house, and a handsome quay of considerable height, as the river rises regularly 12 or 13 feet in the beginning of December. N. lat. 9° 19'. W. long. 74° 11'.

MOMUS, in *Mythology*, was, according to Hesiod, the son

son of Night and Sleep, and was supposed both by the Greeks and Romans to be the god of buffoonery and jests. Satirical to excess, he made even the gods, and Jupiter himself, the objects of his most pungent raillery. None of the ancients have exhibited him in his true and lively colours more appropriately than Lucian. Momus is said to have derived his name from the free and bold manner in which he censured the vices and defects of others; *Momus* in Greek implying censure. It was he who found fault with the gods, because, in the formation of man, they had not made a little hole or window in his breast, that one might have seen into his heart what were his thoughts: though Vitruvius ascribes this reflection to Socrates.

MONA, in *Geography*, or LA GUENON, a small island in the West Indies, between Hispaniola and Porto Rico. N. lat. 18° 10'. W. long. 68° 28'.

MONA, in *Ancient Geography*, an island of Great Britain, now called Anglesea, the ancient seat of the Druids; which was first attempted by Suetonius Paulinus, and afterwards reduced by Agricola. In the British tongue it was called Môn, and when conquered by the English, Anglesey, that is, English island. See ANGLESEY.

MONACHUS, in *Zoology*, a species of *Phoca*; which see.

MONACHUS, in *Ornithology*, a species of *Falco*; which see.

MONACO, in *Geography*, was, before the French revolution, a small principality of Italy, situated on the coast of the Mediterranean, between the county of Nice and the Genoese territory, and about four or five Italian miles in circuit. The chief line of the Grimaldi, who had governed this principality for 800 years successively, failed in 1731; but the eldest daughter of Antony Grimaldi, having been, in 1715, declared heiress of the principality, was married to Francis Leonorus, count de Torrigny; and the fruit of this marriage was Honoratus Camillus Leonorus, who adopted the name and arms of Grimaldi. Monaco is now united to France.

MONACO, a town of France, and principal place of a district, in the department of the Maritime Alps, late capital of the principality above-mentioned, and the residence of the duke. It is a small town, with narrow streets, situated on a rock near the sea: it is fortified and has a garrison and a good harbour, and possesses a right of compelling all ships that pass by to put in and pay toll; 6 miles N.E. of Nice. The place contains 1130, and the canton 3730 inhabitants, on a territory of 37½ kilometres, in 4 communes. N. lat. 43° 43'. E. long. 7° 22'.

MONACONDA, a town of Hindoostan, in Tellingana; 8 miles W.S.W. of Warangole.

MONAD, in the *Philosophy* of Leibnitz, is a simple substance without parts. The existence of monads must be admitted, since without these no compound or aggregate of simple substances could exist. These simple substances are properly called monads, because, as unity is the fountain and origin of numbers, and comprehends all their powers, so simple substances are the matter of, which all corporeal masses are formed. Since monads have no parts, they have neither extension, figure, nor divisibility. They are the true atoms of nature, and elements of things, incapable of destruction, except by the power of God. Each monad differs from every other; for it is impossible that any two things should be found in nature perfectly alike. Monads have an internal principle of variation, by which they are continually varying in a certain manner; and hence arises a plurality of properties and relations. This perpetually varying state, which involves and represents multitude in unity, is perception, which is not, however, to be confounded with consciousness. The

action of the eternal principle of monads, by which a transition is made from one perception to another, may be called appetite. The perception and appetite of monads are not to be explained mechanically by figure and motion, because they are affectations of a simple substance without parts. In monads, therefore, nothing is found but perception and appetite; and in this respect all monads may be said to partake of the nature of soul; although that term is more properly applied to those living beings, which have distinct perception united with memory. The present state of monads arises from the past, and perception from perception, as motion from motion. Monads are, in a state of perception, similar to that of a mind in a stupor, which has a perpetual succession of minute and indistinct perceptions. God alone, says Leibnitz, is primitive unity, or simple original substance, from whom are produced all created or derived monads. These owe their existence to the effusion of the rays of divinity, limited in their effects by the finite capacity of the creatures who receive them. Creatures have not proceeded necessarily from the divine essence, but have been created, according to the plan of the divine understanding, by the energy of the divine will and power; and their continued preservation is a continual creation.

Monads have universally an influence on each other, and are reciprocally active and passive. They are active, in proportion as their perceptions are distinct; passive, as they are confused. In simple substances, the influence of one monad upon another is not mechanical, but ideal, and is not effected without the intervention of the Deity, who directs them according to the ideas of his own intellect. From the universal influence of all creatures upon each individual, and of each upon all, it follows, that every simple substance receives an impression or image of all the rest, and becomes, as it were, a perpetual living mirror of the universe. As the same city viewed from different places appears different, and is optically multiplied; so it happens, that in consequence of the infinite multitude of simple substances in nature, pictures of the universe are multiplied without end; according to the different points of sight of different monads. By these means, all possible variety, and, consequently, all possible perfection, is produced in the universe. Since there is in nature a universal *plenum*, the motion of any body or composition of monads must affect every other body by means of intervening bodies; and every present motion will have a necessary connection with every other future motion; whence he who sees all things can read in the present whatever will happen in any future time or distant place. Although each created monad reflects the whole universe, that monad which is the animating principle of any body, affects that body more distinctly than all others. As the whole body reflects the whole universe by the connection of all matter *in pleno*, so also the soul reflects the whole universe, while it reflects that organized body, by which it is in a peculiar manner perceived, and with which it seems a living animal. Since matter is not only infinitely divisible, but is actually divided without limit, every portion of matter may be conceived to be a world of living creatures; and every part of a living body to be itself full of all other living bodies. All bodies are like rivers, perpetually flowing; some parts entering, and others passing away. The soul changes its body, not instantaneously, but by degrees, so that, strictly speaking, there is no such thing as death, or a state in which the soul is separated from the body. In conception, no new animal is produced; but a pre-existing animal is disposed to a transformation, by which it passes into another species. In death, though the machine in part perishes, the animal itself remains indestructible.

From this concise statement of Leibnitz's system, as it respects monads, it will be easily perceived, that his monads approach nearer to the permanent intelligent natures, called by Pythagoras numbers, and by Plato ideas, than to the solid and indivisible atoms of Epicurus. Brucker's *Philos.* by Enfield, vol. ii. See *LEIBNITZIAN Philosophy*.

MONADELPHIA, in *Botany*, from *μονος*, one, and *αδελφος*, a brother, the 16th class of the Linnæan artificial, or sexual, system, consisting of plants whose filaments are united into one parcel, or set. This union is more or less complete. In the Mallow tribe, the combined filaments make a long tube, crowned at its summit by the anthers, which, from its resemblance to a column, has obtained the name of *columniferæ* for such flowers. In the Geranium family the union is much more slight; while in some genera, as *Oxalis*, it is but partial, or confined to certain species only. The late professor Cavanilles, of Madrid, undertook an illustration of the class *Monadelphia*, in several quarto dissertations, with plates, which make all together two rather thick volumes. In this work he has referred to the class in question a vast number of genera, never before suspected to belong to it, and which unquestionably want its true character. This character consists in an actual union, or immediate coalescence, of the filaments themselves into one body; whereas many of the plants considered by Cavanilles as monadelphous, are so merely through the medium of a tubular nectary, or of some other body, which is no part of the stamens. This is totally inadmissible, for we might just as well refer to this class, every plant whose filaments are connected by insertion into a corolla, or calyx, of one piece.

The class *Monadelphia* is not in itself a natural one, though it embraces some tribes that are natural combinations, as the *Columniferæ* and *Gerania*. Its orders are distinguished by the number of stamens, easily determined at their upper part, bearing the anthers, where they are always, for a considerable distance, separate and distinct. These orders are eight, *Triandria*, *Pentandria*, *Heptandria*, *Octandria*, *Decandria*, *Endecandria*, *Dodecandria*, and *Polyandria*; of which the last, comprising the *Columniferæ*, and some other noble plants, is the most numerous and important.

MONADELPHIA is also the name of an order of the 21st and 22d classes (*Monoccia* and *Dioccia*) of the Linnæan system, founded on the same character as the class so denominated. This order in the 21st class is chiefly formed of the Fir, or coniferous, tribe, and of some of the natural order of *Euphorbiæ* of Jussieu; in the 22d also it contains some of the allies of the Fir, with a very few genera besides. Professor Willdenow has removed the Gourd or Cucurbit tribe to the *Monoccia Monadelphia*, justly perceiving that they were inaccurately referred to *Monadelphia Syngenesia* by Linnæus; an order which, as far as is hitherto known, has no existence in nature. Their anthers in fact are quite distinct, their filaments only being more or less combined. But this combination is not into one set, except perhaps in *Sicyos* and *Seebium*. The rest of this tribe are by no means monadelphous, but polyadelphous, their five stamens being united by their filaments into three sets. See **MOMORDICA**.

MONADNOCK, GREAT, in *Geography*, a mountain of America, in Cheshire county, New Hampshire, between the towns of Jeffrey and Dublin. The foot of the hill is 1395 feet, and its summit 3254 feet, above the level of the sea. Its base is five miles in diameter from N. to S., and three from E. to W. On the sides are some appearances of subterraneous fires.

MONADNOCK, Upper Great, a high mountain in Canaan, in the N.E. corner of the state of Vermont.

MONAGHAN, a county of Ireland, in the province of Ulster. It is rather of an oblong form, having its greatest extent from north to south, and being very narrow, except in one part, where it stretches between the counties of Fermanagh and Cavan, which form its western boundary. On the north it runs into the county of Tyrone in an angular direction, being separated from it on the north-east by the river Blackwater. The county of Armagh lies on the east of it, that of Louth on the south-east, and that of Meath on the south. The length of this county is 30 miles (38 English) from north to south; its greatest breadth is 19 miles (24 English), but in most parts it does not exceed 10. and is not always so much. The area is 179,600 Irish plantation equal to 288,500 English acres; and in square miles 280 Irish or 450 English. This is the statement of Dr. Beaufort and Sir Charles Coote. Mr. Wakefield, for what reason he does not state, says the area is 509 English miles. The whole is divided into 21 parishes, of which 20 had churches when Dr. Beaufort published, all in the diocese of Clogher. The population is stated by Dr. Beaufort at 118,000 for 21,523 houses; but the general increase since the publication of his work is sufficient ground for considering it too low an estimate.

Monaghan has a large proportion of bog, and a great number of small lakes, which, together with its being exposed to the north-westerly winds, render it very damp, though it is far from being unwholesome. On the north-west the Slieb-Baught mountains divide it from Tyrone; and on the east the Fews mountains are the boundary. In most parts of the county the surface is hilly, but no part is inaccessible to the plough. The turf bogs, supplying abundance of fuel, are of great value, and have been reckoned one cause of its great population, in which it is inferior to no county in Ireland, Dublin and Armagh alone excepted. The soil is in general deep clay, which is particularly favourable for flax, and this is the principal crop. In 1809 three thousand two hundred acres were sown with flax, a greater number in proportion to the extent than in any county except Armagh. Potatoes and oats are successfully cultivated, but there is very little wheat; and the small farms into which the land is divided do not answer for grazing or dairy husbandry. The lower classes are sensible of the value of vegetables, which are raised very abundantly in their little gardens; and with similar encouragement to that given by lord Hardwicke on his estate in Cambridgeshire, these gardens would contribute in a still greater degree to the comfort of the proprietors. The linen manufacture is the great object of the people, and is productive of its usual happy effects, though it is not favourable to improved agriculture. The Slieb-Baught mountains, which extend into this county from Tyrone, form an uninterrupted ridge of high land, the highest part of which is called Cairnmore. These have, in general, neither a fruitful soil, nor any natural beauties to recommend them, being an uninteresting waste, and almost always wet and moory. There are parts, however, which have beds of the richest limestone, and abundance of marble, particularly on the eastern side of Cairnmore. This mountain is famous for its millstone quarry. Those most valued consist of a red and very hard grit or sandstone, the grain of which is close. There is also a soft whitish sandstone, which is more easily procured, but which soon wastes away. In this neighbourhood is also a fine kind of potters' clay, which is carried to the pottery at Dundalk, and is used in making the best thin glazed ware. Indications of coal have also been observed here, and in other parts of the county. Crieve, which is south of the town of Ballibay, is the highest ground in Monaghan. The stone here is of a very hard

hard quality, of a colour between blue and dark green, and is found to answer very well for building. It is called *rubinstone*, and seems to be a kind of greenstone. Crieve abounds with lead ore of the richest quality. On the summit of this mountain is a lake covering about fifty acres, which is very deep, and is principally supplied from springs. This lake serves as a reservoir for supplying a number of bleach-mills, fourteen of them being worked by the stream flowing from it. The consequence of these establishments has been the reclaiming of a considerable part of the mountain, notwithstanding the badness of the soil; so that what was regarded a few years ago as a waste with nothing to recommend it, has, in consequence of the application of a stream of water to the prevailing manufacture, become a most thriving and valuable district. It has been already mentioned, that Monaghan abounds with small lakes which might be turned to the supply of a canal extending through it from lough Neagh to lough Erne, which seems to be practicable without very great expence, should the improvement of the country render it desirable. The number of these lakes is 184, of which 30 are considerable sheets of water. Lough Barrac, near Castle Blayney, and the lake of Kilerow at Coote Hill, principally deserve notice for their extent and beauty. The rivers are numerous, but inconsiderable. Of Monaghan, the county town, an account will be given in the next article. Clones, Carrickmacross, Castle Blayney, and Ballibay, have been noticed in preceding volumes under their respective heads. As none of them are boroughs since the Union, Monaghan is represented in parliament by only two members, who are, according to Mr. Wakefield, returned by no individual prevailing interest.

In the history of Ireland we do not find any matter of moment relating to this county until the reign of James I., when 500,000 acres in Ulster were escheated to the crown under the charge of the proprietors being disaffected to the king's government, which forfeiture included almost the whole of Monaghan. A great part of these lands was soon after assigned to British adventurers, mostly Scotch; but considerable estates were left, according to sir John Davis's statement, to several of the name of M'Mahon, which had been the prevailing family in it. These were probably forfeited at a subsequent period, as the name of M'Mahon does not occur in the list of the present proprietors given by sir Charles Coote. "The rent rolls of large estates," says the writer last named, "will be found from near 20,000*l.* to 1,000*l.* per annum, and a very considerable part is held in grants from 20*l.* to 500*l.* per annum. The large estates are in no instance resided on by the immediate proprietors, but the lesser ones are almost uniformly otherwise, and are held in grants from the crown, since the Scotch colony was introduced here; and also a considerable share of these lands comprehended gifts to Cromwell's soldiers, many of whose posterity now enjoy so small a tract, as does not yield above 20*l.* annual income. I suppose taking the large farms in Monaghan they would not average 25 acres; nor could the small ones, which are far more numerous, average six acres, so that ten may be the mean rate of the whole county." "The largest estates," according to Mr. Wakefield, "exhibit the most wretched cultivation; fields without hedge-rows, and enclosed only by earthen banks or dykes; land running to waste, which, with great truth, may be compared to its inhabitants, that is, losing its strength for want of proper nourishment, and existing in a state of the utmost poverty." It would be easy to enlarge upon the evils arising from non-resident landlords, rack-rents paid to middle men, and a consequent wretched system of agriculture; but to do so in this place would not be likely to contribute to amendment, and the re-

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marks would not belong to this more than to many other counties. Beaufort's Memoir. Sir C. Coote's Statistical Survey. Wakefield's Account of Ireland.

MONAGHAN, a market and post-town of Ireland, and the shire-town of the county of Monaghan, described in the preceding article. Before the Union it was a borough, but is not now represented. It is 62 miles N.N.W. from Dublin. N. lat. 54 16'. W. long. 6 49'.

MONAH, a town of Hindoostan, in Baramaul; eight miles N. of Namacul.

MONALIAN, a township of America, in York county, Pennsylvania.

MONAINCHA, in *Ecclesiastical Antiquities*, the name of a celebrated old monastery in Ireland, which belonged to the Culdees, and is mentioned by Cambrensis. It is situated in the bog of Monela, in the county of Tipperary; three miles S.E. from Roscrea. Archdall. Ledwich.

MONAMBASCHAGATT, a town of Africa, on the river Camarones.

MONANDRIA, in *Botany*, from *μνος*, one, and *ανδρ*, a man, the first class of the Linnæan sexual, or artificial, system, characterized by having one stamen only, in the same flower with the pistil. It consists of two orders, distinguished by the number of their styles, or sessile stigmas; like all the orders of the first 13 classes of this system. Some few species of *Valeriana*, a naturally triandrous genus, are monandrous.

The character of this class is in general easy and obvious, but a difference of opinion exists among botanists, concerning some genera which Linnæus has referred to it. These are of the natural order of *Scitamineæ*, in several of which order the two lobes of the anther are separated by the breadth of the filament, which is in them unusually great. But that these two lobes do really constitute one anther only, is evident from other genera of the same natural order, in which, the filament being but of the ordinary slender dimensions, the two lobes are brought closely together. There are other instances of a similar distance between the two lobes of an anther, as in *Berberis*.

MONANDRIA is likewise the name of an order of the class *Gynandria*, as well as of the *Monœcia* and *Diœcia*. Respecting the two last, every body is agreed, but the first has been established since the time of Linnæus, and consists of all the known *Orchideæ*, except *Cypripedium*, which that great botanist considered as having two anthers, but which prove, on a correct investigation, and especially by the analogy of the *Scitamineæ*, to have really but one. See ORCHIDEÆ and SCITAMINEÆ.

Some species of *Salix*, considered as monandrous, are perhaps more truly monadelphous, their anther being certainly double, and their filaments two, united into one from the bottom to the very summit. In other species this union is but partial, and these are universally deemed monadelphous.

MONANTHUEIL, HENRY DE, in *Biography*, or, when latinized, *Monantholius*, a French physician and mathematician, was born of a noble family, possessed of an estate of the same name, in the Vermandois, about the year 1536. His birth place was Rheims; but he received his education in the college of Presla, at Paris, under the direction of the celebrated Ramus, whose doctrines he afterwards defended. He then transferred his studies to the college royal, where he applied with ardour both to mathematics and medicine, and received the degree of doctor in the latter science. He held the office of dean of the faculty of medicine for two successive years, 1578 and 1579. His mathematical acquirements had obtained for him the appointment of professor in 1576,

which he fulfilled with so much distinction, as to gain the honour of numbering among his auditors the celebrated James Augustus de Thou, the learned Peter de Lamoignon, and other eminent characters. He continued to perform the duties of this professorship with undiminished zeal and reputation, for a period of thirty years; while at the same time he did not neglect those of his medical office. He was extremely active in maintaining the privileges of the faculty, and successfully exposed the impositions of a noted empiric of his day, named La Riviere, who was exiled from Paris by an arrêt of parliament. He was on terms of intimate friendship with William du Vair, keeper of the seals; and was the Musæus, on whom that gentleman bestowed so high an eulogium in his discourse "On Constancy." He was distinguished by his steady loyalty during the trouble of the league, and pronounced the first public panegyric on king Henry IV., when his majesty obtained the possession of Paris from the hands of that faction. He died in the year 1606, highly respected for every quality that could adorn the man and the scholar. He was author of the following works: "Liber de Angulo Contactus, adversus Jacobum Peletarium," 1581;—"Oratio, quale esse deberet Collegium Professorum Regionum," 1595;—"Ludus Jatro-mathematicus, Musis factus," 1597;—"Commentarii in Librum Aristotelis de Mechanicis," with the Greek text, and a new Latin version, 1599;—"De Puncto, primo Geometriæ principio, Liber," 1600;—"Problematis omnium quæ à 1200 annis inventa sunt nobilissimi Demonstratio," 1600. And he left in an unfinished state a large mathematical work, entitled "Hepatecon Mathematicum," on which he had been long occupied. Gen. Biog. Eloy Dict. Hist.

MONARCHICI, in *Church History*, heretics towards the end of the second century, who allowed but one person in the godhead, and maintained that the father, the creator of all things, had united himself to the human nature of Christ; whence they were called Monarchians; and they also taught that the father was crucified; on this account they were denominated Patripassians.

MONARCHY, *μοναρχία*, a large state governed by one; or a state where the supreme power is lodged in the hands of a single person.

The word comes from the Greek *μοναρχος*, one who governs alone; formed of *μονος*, solus, and *αρχη*, imperium, government.

Of the three forms of government, *viz.* democracy, aristocracy, and monarchy, the last is the most powerful, all the sinews of government being knit together, and united in the hand of the prince; but then there is imminent danger of his employing that strength to improvident or oppressive purposes. As a democracy is the best calculated to direct the end of a law, and an aristocracy to invent the means by which that end shall be obtained, a monarchy is most fit for carrying those means into execution.

Honour, says Montesquieu, which aspires to preferments and distinguishing titles, is the prevailing principle in monarchies; this sets all the parts of the body politic in motion; by its very action it connects them, and thus each individual advances the public good, while he only thinks of promoting his own particular interest; this principle gives life, not only to the whole body politic, but to the laws, and even to the virtues themselves. This principle is altogether unknown in despotic governments; of which fear is the principle.

As honour is the principle of a monarchical government, systems of education and of legislation should be formed and conducted with a constant regard to this principle. The nobility should be rendered respectable and hereditary,

and their lands should have privileges annexed to them as well as their persons. The laws should also favour all kinds of commerce, consistent with the constitution of the government, that the subjects may be able, without ruining themselves, to satisfy the continual cravings of the prince and his court. Some fixed regulation should also be established; that the manner of collecting the taxes may not be more burdensome than the taxes themselves.

Monarchy has a great advantage over a despotic government. As it naturally requires there should be several orders belonging to the constitution under the prince, the state is more fixed, the constitution more steady, and the person of him that governs more secure. We may also add, that as people who live under a good government, are happier than those who, without rule or leaders, wander about the forests; so monarchs who live under the fundamental laws of their country, are far happier than despotic princes, who have nothing to regulate either their own, or their subjects' hearts. In monarchies, where honour alone predominates, the prince's rewards would consist only of marks of distinction, if the distinctions established by honour were not annexed to a luxury which is necessarily attended with wants; the prince therefore is obliged to confer honours that lead to wealth; and it is a general rule, that great rewards, in monarchies and republics, are a sign of their decline; because they are a proof of their principles being corrupted, and that the idea of honour has no longer the same force in monarchy, nor the title of citizen the same force in a republic. The very worst Roman emperors were those who were most profuse in their largesses, *viz.* Caligula, Claudius, Nero, Otho, Vitellius, Commodus, Heliogabalus, and Caracalla. The best, such as Augustus, Vespasian, Antoninus Pius, Marcus Aurelius, and Pertinax, were economicals. Under good emperors the state resumed its principles; all other treasures were supplied by that of honour. In a republic presents are odious, because virtue does not need them. In monarchies honour is a much stronger incentive than presents. But in a despotic government, where there is neither honour nor virtue, people cannot be determined to act but through hopes of the conveniences of life. In monarchical governments, Montesquieu is of opinion, that the laws ought not to oblige a subject to accept of a public employment; nor should a subject be obliged to accept of a post in the army inferior to what he held before, because honour, true or false, will never bear with what it calls degrading itself; nor should civil and military employments be conferred on the same person; nor is venality of public employments improper, as he thinks, in monarchies. He adds, that in monarchies there should be no censors, because being founded on honour, it is in the nature of honour to have the whole universe for a censor. In monarchies, the administration of justice, which decides not only in regard to life and property, but likewise to honour, demands very scrupulous inquiries. In monarchies, it is a great inconvenience for the ministers of the prince to be judges. Our author thinks, that luxury is extremely proper for monarchies, and that under this government there ought to be no sumptuary laws. Republics, he says, end with luxury, and monarchies with poverty. As democracies are destroyed when the people despoil the senate, magistrates, and judges of their functions; so monarchies are corrupted when the prince insensibly deprives societies of their prerogatives, or cities of their privileges. In the first case the multitude usurp a despotic power; in the second it is usurped by a single person. Monarchy is destroyed, when a prince thinks he shews a greater exertion of power in changing, than in conforming to the uses of things; when he deprives some of

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his subjects of their hereditary employments, to bestow them arbitrarily upon others, and when he is fonder of being guided by his fancy than by his judgment. It is destroyed, when the prince, directing every thing to himself, calls the state to his capital, the capital to his court, and the court to his own person. Monarchy is destroyed, in fine, when the prince mistakes his authority, his situation, and the love of his people; and when he is not fully persuaded, that a monarch ought to think himself secure, as a despotic prince ought to think himself in danger. *Montesq. Sp. of Laws, vol. i. passim.*

The most ancient monarchy was that of the Assyrians, which was founded soon after the deluge, in the year 259 B.C. We usually reckon four grand or universal monarchies; the Assyrian, Persian, Grecian, and Roman; though St. Augustine makes them but two, *viz.* those of Babylon and Rome. Belus is placed at the head of the series of Assyrian kings who reigned at Babylon, and is by profane authors esteemed the founder of it, and by some the same whom the scriptures call Nimrod. The principal Assyrian kings after Belus were Nimus, who built Nineveh, and removed the seat of empire to it; Semiramis, who, disguising her sex, took possession of the kingdom instead of her son, and was killed and succeeded by her son Ninyas; and Sardanapalus, the last of the Assyrian monarchs, and more effeminate than a woman. With him terminated the ancient monarchy of Assyria, in the year 820 B.C. After his death, the Assyrian empire was split into three separate kingdoms; *viz.* the Median, Assyrian, and Babylonian. The first king or prefect of the Median kingdom was Arbaces; and this kingdom lasted till the time of Assyages, who was subdued and divelled of his kingdom by Cyrus. The first king of the new Assyrian kingdom was Phul, who began his reign in the year 777 B.C., and this kingdom was united to that of Babylon under Assaradinus, 680 B.C. The Babylonian kingdom commenced under Nabonassar, 747 B.C., and after being united to that of Assyria, was again separated, 667 B.C., Saosduchinus being its first king, and Nimus II. king of Assyria. These monarchies continued separate until the year 606 B.C., when Assyria was united to Media. The Babylonian kingdom terminated by the conquest of Cyrus, 538 B.C. In the time of Cyrus, there arose a new and second monarchy, called the Persian; which stood upwards of two hundred years, from Cyrus, whose reign began 559 B.C., to Darius Codomannus, who was conquered by Alexander, 331 B.C., and the empire translated to the Greeks. The first monarch was Cyrus, founder of the empire; the second Cambyfes, the son of Cyrus. 3. Smerdis. 4. Darius, the son of Hytaspes, who began his reign 521 B.C. 5. Xerxes, who succeeded Darius, 485 B.C. 6. Artaxerxes Longimanus, who commenced his reign 464 B.C. 7. Xerxes II., who began his reign 425 B.C. 8. Ochus, or Darius, called Nothus, 424 B.C. 9. Artaxerxes Mnemon, 404 B.C. 10. Artaxerxes Ochus, 358 B.C. 11. Arses, 337 B.C. 12. Darius Codomannus, 335 B.C., who was defeated by Alexander the Great, and deprived of his kingdom and life about 331 B.C.; and the dominion of Persia after his death was translated to the Greeks. The third monarchy was the Grecian. As Alexander when he died did not declare who should succeed him, there started up as many kings as there were commanders. At first they governed the provinces, that were divided among them, under the title of viceroys; but when the family of Alexander the Great was extinct, they took upon them the name of kings. Hence, in process of time, the whole empire of Alexander produced four distinct kingdoms; *viz.* 1. The Macedonian, the kings

of which, after Alexander, were Philip, called Arrideus, 323 B.C., Cassander, 316 B.C., Antipater and Alexander, 298 B.C., Demetrius Poliorcetes, 294 B.C., Pyrrhus, 287 B.C., Lysimachus, 286 B.C., Ptolemy, called Cerannus, 280 B.C., Meleager, 279 B.C., Antipater the Etesian, 278 B.C., Antigonus Gonatas, 277 B.C., Demetrius, 243 B.C., Antigonus Dofon, 232 B.C., Philip, 221 B.C., and Perseus, 179 B.C., under whom the Macedonian kingdom was reduced to the form of a Roman province. 2. The Asiatic kingdom, which, upon the death of Alexander, fell to Antigonus, 311 B.C., comprehending that country now called Natolia, together with some other regions, beyond Mount Taurus. From this kingdom proceeded three lesser ones; *viz.* that of Pergamus, whose first king was Philetaerus the Eunuch, 283 B.C., and whose last king, Attalus, called Philometor, in the year 132 B.C., appointed the Roman people to be his heir: Pontus, reduced by the Romans into the form of a province, when they had subdued the last king, Mithridates; and the Syrian. 3. The Syrian, to which that of Babylon was united, of whose twenty-two kings the most celebrated were Seleucus Nicator, founder of the kingdom, 312 B.C., Antiochus Deus, 261 B.C., Antiochus the Great, 223 B.C., Antiochus Epiphanes, 175 B.C., Tigranes, 83 B.C., and Antiochus Asiaticus, 69 B.C., who was conquered by the Romans under Pompey; and Syria was reduced into the form of a Roman province, 65 B.C. 4. The Egyptian, which was formed by the Greeks in Egypt, and flourished near two hundred and forty years under twelve kings; the principal of whom were Ptolemy Lagus, its founder, 323 B.C., Ptolemy Philadelphus, 284 B.C. founder of the Alexandrian library; and queen Cleopatra, who was overcome by Augustus; in consequence of which Egypt was added to the dominion of the Romans, 30 B.C. The fourth monarchy was the Roman, which lasted two hundred and forty-four years, from the building of the city, until the time when the royal power was abrogated. The kings of Rome were Romulus its founder, Numa Pompilius, Tullus Hostilius, Ancus Martius, Tarquinius Priscus, Servius Tullius, and Tarquin the Proud, who was banished, and with whom terminated the regal power. *Holberg's Introd. to Univ. Hist. by Dr. Sharp, p. 85, &c.*

There seems, in reality, no necessity to make the Medes, Persians, and Greeks, succeed to the whole power of the Assyrians, to multiply the number of the monarchies: it was the same empire still, and the several changes that happened in it, did not constitute different monarchies. Thus the Roman empire was successively governed by princes of different nations, yet without any new monarchy being formed thereby. Rome, therefore, may be said to have immediately succeeded Babylon in the empire of the world. See EMPIRE.

Of monarchies some are *absolute* and *despotic*, where the will of the monarch is uncontrollable, as Denmark, &c.; others are *limited*, where the prince's authority is restrained by laws, and part of the supreme power lodged in other hands; as in England. See GOVERNMENT.

Some monarchies, again, are *hereditary*, where the succession devolves immediately from father to son; and others are *elective*, where, on the death of the monarch, his successor is appointed by election.

According to Hobbes, monarchy, as well as aristocracy, derives all its authority from the people, who transfer all their right, *v. gr.* the supreme power, by a plurality of suffrages, &c. to some one person called a monarch; so that whatever the people could have done before this translation, may be now rightfully done by him to whom

the translation is made. This done, the people are no longer to be looked upon as a body, but a dissolved multitude; because they were only one by virtue of the supreme power, which they have now transferred to another.

Nor can the monarch, according to this author, oblige himself by any covenants, to any person, for the authority he has received; because he receives the power from the people, which, as soon as that is done, ceases to be a body; and the body ceasing, the obligation to the body ceases of course. The people, therefore, are obliged to pay obedience to the monarch, by virtue of those covenants, whereby they mutually oblige themselves to what the people, as a body, enjoin to be done.

He argues, farther, that as a monarch cannot be obliged by any covenants; so neither can he do any injury to his subjects; an injury being nothing else but a breach of covenant; and where there is no covenant, there can be no breach of one. De Cive, c. 8. See HOBBIISM.

Fifth-MONARCHY Men, in the *Ecclesiastical History of England*, were a set of wrong-headed, and turbulent enthusiasts who rose in the time of Cromwell, and who expected Christ's sudden appearance upon earth to establish a new kingdom: and, acting in consequence of this illusion, aimed at the subversion of all human government. Burnet's Hist. of his Own Times, vol. i. p. 67.

MONARDA, in *Botany*, named in honour of Nicholas Monardes, a Spanish physician and botanist who lived at Seville towards the close of the sixteenth century, and who published various treatises relating to the natural productions, and especially to the *Materia Medica*, of the new world.—Linn. Gen. 16. Schreb. 22. Willd. Sp. Pl. v. 1. 124. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 50. Vahl. Enum. v. 1. 217. Michaux. Boreal-Amer. v. 1. 16. Juss. 111. Lamarck Illustr. t. 19. Gærtn. t. 66.—Class and order, *Diandria Monogynia*. Nat. Ord. *Verticillatae*, Linn. *Labiatae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, cylindrical, striated, permanent, with a five-toothed, equal mouth. *Cor.* unequal; tube cylindrical, longer than the calyx; limb ringent: upper lip straight, narrow, linear, undivided; lower reflexed, broader, cloven into three segments, of which the middle one is longer, narrower, and emarginate; its sides obtuse. *Stam.* Filaments two, bristle-shaped, as long as the upper lip, by which they are embraced; anthers compressed, truncated at the top, convex and straight at the lower part. *Pist.* Germen superior, four-cleft; style thread-shaped, parallel to the stamens; stigma cloven, acute. *Peric.* none. *Seeds* four, roundish, lying at the bottom of the calyx.

Obs. *M. didyma* has four stamens, two of which are abortive.

Eff. Ch. Corolla unequal, its upper lip linear, and inclosing the filament. Seeds four.

1. *M. fistulosa*. Purple or Crimson Canada Monarda. Linn. Sp. Pl. 32. J. Miller. Illustr. t. 3. (*M. fistulosa*, var.; Curt. Mag. t. 145.)—Leaves oblong-lanceolate, pointed, hairy, flat. Stems obtusely angular.—Native of Canada as well as other parts of North America, cultivated by Mr. John Tradescant in 1656. It flowers from June to August.—*Root* perennial, strongly fibrous and spreading. *Stems* nearly three feet high, obtusely angular, hairy, branched at the upper part. *Leaves* opposite, on short stalks, broad at the base, but sharply pointed at the end, hairy and toothed. *Flowers* in one or two terminal, dense whorls, of a beautiful deep crimson colour.—The whole herb is remarkable for its fragrance as well as beauty, and is not

unfrequently cultivated in our gardens. The variety figured by Curtis, and quoted above, is larger and more showy than the original species, its blossoms far surpassing that in size and brilliancy of colour. The floral leaves also are richly tinted with lilac or purple.—Upon comparing Curtis's figure with the Linnæan Herbarium, it appears that this variety of *fistulosa* is what Linnæus has called *M. mollis* in the third volume of the *Amanitates Academicae*, p. 399.—It may be propagated by parting its roots.

2. *M. oblongata*. Long-leaved Monarda. Willd. n. 2. Ait. Hort. Kew. ed. 2. v. 1. 51.—Leaves oblong-lanceolate, rounded and somewhat contracted at the base, hairy, flat.—Native of North America, and cultivated in 1761, by Mr. James Gordon. It flowers from July to September.—There is no figure of this species, but, from a specimen in Dr. Smith's herbarium, we find that it chiefly differs from the preceding in having its *leaves* more oblong, and more attenuated, though not actually tapering, at the base; they are also more hairy on the under side. The *calyx* is shorter and more hairy at the margin. The *flowers* also are smaller.

3. *M. didyma*. Scarlet Monarda, or Oswego-Tea. Linn. Sp. Pl. 33. Curt. Mag. t. 546. (*M. coccinea*; Michaux. Boreal-Amer. v. 1. 16.)—Leaves ovate, smooth. Whorls of flowers capitate, with two imperfect, additional stamens. Stem acutely angular.—Native of hills on the mountains of North America; introduced into this country by Peter Collinson, before 1752. It flowers from June to August.—*Root* perennial. *Stems* about two feet high, squarish, acutely angular, branched so as to become bushy towards the top. *Leaves* opposite, on short stalks, toothed and fringed at the edge, when bruised, emitting a grateful, refreshing smell, which, independently of the beauty of the plant, would entitle it to a place in every garden. *Flowers* much like those of *M. fistulosa* in habit, but larger, and of a rich scarlet hue; most of them furnished with two additional abortive stamens, whence the specific name.—This increases greatly by throwing out radical shoots, which may be transplanted.

4. *M. rugosa*. White Monarda. Willd. n. 4. Ait. Hort. Kew. ed. 2. v. 1. 51.—Leaves ovato-lanceolate, heart-shaped, smooth, rugose.—Native of North America; cultivated in 1761, by Mr. James Gordon; flowering from July to September.—This species is adopted by Vahl and Martyn from Aiton, but as we are unacquainted with any specimen or figure, we can only give professor Willdenow's description, who says that it is very nearly allied to the following species, *M. clinopodia*, but that its *leaves* are longer, smoother, and somewhat rugose like those of many species of *Salvia*. The *flowers* also are white.

5. *M. clinopodia*. Wild Basil-leaved Monarda. Linn. Sp. Pl. 32.—Leaves ovato-lanceolate, smooth, rounded and unequal at the base.—Native of Virginia; cultivated by Mr. William Malcolm in 1771. It flowers in July.—*Root* creeping. *Stems* about two feet high, square, rather acutely angular, branched. *Leaves* opposite, remarkably smooth, attenuated, remotely serrated; the floral ones narrower, and coloured at the base. *Flowers* capitate, terminal, of a pale colour.—The specific name originated from a striking resemblance in the leaves to those of *Clinopodium incanum*, and was originally written by Linnæus, on the specimen in his herbarium, *clinopodifolia*.

6. *M. punctata*. Spotted Monarda. Linn. Sp. Pl. 32. Andr. Repof. t. 546. Sm. Insects of Georgia, t. 24. (*M. lutea*; Michaux Boreal-Amer. v. 1. 16.)—Flowers in whorls. Corolla spotted. Bractæas large and coloured.—Native of North America; cultivated here in 1714, by Mr. Thomas Fairchild.

Yairchild.—*Root* biennial. *Stems* erect, nearly two feet high, branched, jointed. *Leaves* in stalks, lance-late, in clusters at each joint, serrated from the middle to the end, smooth, veined. *Flowers* axillary, in dense whorls, yellow, spotted with purple, accompanied by very handsome, crimson bracteas. Michaux has changed the specific name to *lutea*, because he observes, the corolla in every species of *Monarda* is spotted. We cannot however accede to this change, as in our present plant, the spots on the corolla are so infinitely more apparent than in any other, as to render the name sufficiently descriptive.

7. *M. allophylla*. Variegated-leaved *Monarda*. Vahl. Enum. v. 1. 219. Michaux. Boreal-Amer. v. 1. 16.—Leaves oblong, serrated. Calyx bearded at the border. Flowers capitate, terminal.—Found by Michaux in North America, from whom and Vahl all that we know of it is collected. The former says, that the shape, serratures, and pubescence of its leaves are so various as to induce a supposition that its varieties may constitute different species. *Flowers* flesh-coloured.

8. *M. ciliata*. Virginian ciliated *Monarda*. Linn. Sp. Pl. 33. (*Chnopodium angustifolium non ramosum, flore caeruleo: labio trifido, atripurpureis maculis ornato; Pluk. Alm. t. 164. f. 3.*)—Leaves oblong or oval, gradually pointed. Flowers capitate, whorled. Bracteas ciliated.—Native of Virginia and Carolina. Introduced at Kew by Mr. Francis Masson in 1798. It flowers in July.—*Root* creeping. *Stems* a foot or more in height, distantly jointed, hairy, especially at the upper part. *Lower leaves* on stalks, roundish, an inch long, notched; upper ones sessile, narrower. *Flowers* capitate, in whorls, large, blue, elegantly marked, with dark purple spots. The habit and appearance of this species are different to all the rest, and it has the smell of Mint.

MONARDA, in *Gardening*, contains plants of the fibrous-rooted, herbaceous, showery, biennial, and perennial kinds, of which the species cultivated are: the purple monarda (*M. fistulosa*); the long-leaved monarda (*M. oblongata*); the scarlet monarda, or Oswego tea (*M. didyma*); the white monarda (*M. rugosa*); and the spotted monarda (*M. punctata*).

Method of Culture.—All these plants may be increased by parting the roots, and some of them by slips and cuttings as well as seeds. But as the first sort does not increase fast by the roots, the seeds may be sown in the autumn on a bed of good earth, and in the following summer the plants be removed into nursery rows half a foot apart, in a rather shady situation, and in the beginning of the following autumn set out where they are to remain and flower. They succeed best in a soft loamy soil not too much exposed.

The roots should be divided either in the autumn or very early spring, but the former is the better season, being afterwards either planted out in rows till they are strong, or, when strong, at once where they are to remain. And strong slips or cuttings of the branches may be taken off in the beginning of summer, and planted out in a shady border, due shade and water being given till well rooted, when in the autumn they may be removed to where they are to remain.

The third species succeeds best in a light soil in an eastern aspect.

These plants all afford ornament in the borders and clumps of pleasure-grounds, &c.

MONARDES, NICHOLAS, in *Biography*, a Spanish physician, was born at Seville in the early part of the sixteenth century. He received his education at the university of Alcalá de Henarez, and settled in the practice of his pro-

fession in his native city. Little is recorded respecting his life, which terminated at the same place in the year 1578. He was considerably distinguished, however, by his writings, the first of which related to a controverted question, and was entitled, "De secunda vena in Pleuritudine inter Græcos et Arabes concordia," Hispal. 1539. His next was a tract, "De Rosa et partibus ejus; de succi Rosarum temperatura, &c."—But his reputation was chiefly extended by his work, in the Spanish language, concerning the medicinal substances imported from the new world, entitled, "Dos Libros de las cosas que se traen de las Indias Occidentales, que sirven al uso de Medicina," Sevilla 1565. It was reprinted in 1569 and 1580, and to the latter edition a third book was added. Charles l'Ecluse, or Clusius, translated this work into Latin, with the title of "Simplicium Medicamentorum ex novo orbe delatorum, quorum in Medicina usus est, Historia," Antw. 1574, and improved it by his annotations, and by the addition of figures. This work was also translated into Italian and French. The botanist will seek in vain for accuracy in his descriptions, but the work was useful, by exciting the public attention to medicines heretofore little known. Monardes also published three works in Spanish, which were translated into Latin by l'Ecluse, with the title of "Nicolai Monardi Libri tres, magna Medicinæ secreta et varia Experimenta continentes," Lugd. 1601. The first of these relates to the lapis bezoardicus; the second, to the use and properties of steel, which he was the first after Rhazes to recommend as a deobstruent, according to Dr. Freind; and the third, to the efficacy of snow. His name is perpetuated by the botanical genus *Monarda*, in the class diandria of Linnæus. Eloy Dict. Hist. Gen. Biog.

MONAS, in *Natural History*, a genus of insects of the order Infusoria. The generic character is, worm invisible to the naked eye, most simple, pellucid, resembling a point. This genus includes five species, of which three are found in our own country. Mr. Adams describes five other species.

Species.

* *ATOMUS*. Whitish, with a variable point. The animalcule itself appears as a white point, which, when highly magnified, is egg-shaped: the smaller end is generally marked with a black point, of which the situation is sometimes varied, and found at the other end. Sometimes there are two black points seen crossing the middle of the body. Mr. Adams says it was found in sea-water that had been kept the whole winter; it was not fetid, but no other species of animalcule could be discovered in the same water.

PUNCTUM. A solid opaque black point. The animalcule of this species are very minute points, solid, opaque, and black, round and long. They are dispersed in the infusion, and move with a slow wavering motion, and were found in a fetid infusion of pears.

* *MICA*. This is transparent, or rather semi-transparent, like talc, with an oval moveable circle in the middle. It may be discovered sometimes in very pure waters with the third lens of a single microscope: when the magnifying power is increased, it appears nearly spherical, or oval, as it seems able to assume either of these forms at pleasure. There is a considerable variety in its motions: it often turns round for a long time in the same place. An appearance has been exhibited like two kidneys in the middle of the body, and the little animal is beautifully encompassed with a kind of halo, arising, most probably, from invisible and vibrating fibrillæ.

* *LENS*. This, as its name imports, is transparent, with frequently

frequently a greenish margin. It is nearly of a round figure, and so pellucid, that it is not possible to discover the least vertige of intestines. The animalcula of this species are frequently seen collected together, forming a kind of vesicular or membranaceous mass. The motions of the *lens* are in general rapid, and Mr. Adams says that two united together may frequently be seen swimming among the rest; while in this situation they have been mistaken by observers for a different species, but it is the same generating another by division. It is found in almost all kinds of water; also in infusions of animal and vegetable substances, myriads are said to be contained in a single drop.

TERMO. A most minute simple gelatinous point. Of this Mr. Adams observes, "Among the various animalcula which are discovered by the microscope, this is the most minute and the most simple; a small jelly-like point, eluding the powers of the compound microscope, and being but imperfectly seen by the single; these and some others of the *Monas* kind are so delicate and slender, that it is no wonder they often escape the sight of many who have examined infusions with attention; in a full light they totally disappear, their thin and transparent forms blending as it were with the water in which they swim. Small drops of infused water are often so full of these, that it is not easy to discover the least empty space, so that the water itself appears changed into another substance less transparent, but consisting of innumerable globular points, thickly sown together; which, though full of life, seem only a kind of inflated bladder. In this a motion may be perceived, something similar to that which is observed when the sun's rays shine on the water, the animalcula being violently agitated, or in commotion like a hive of bees."

Such are the species described in Gmelin's edition of Linnæus. Mr. Adams has mentioned five others as follow:

OCCELLUS. Transparent like tale, with a point in the middle. The margin is black; it moves irregularly; is found in ditches covered with conserva, and frequently with the "*Cyclidium milium*."

TRANQUILLA. Egg-shaped, transparent, with a black margin. The animalcula of this species seem to be animated points, and nearly fixed to one spot, where they have a fluctuating and reeling motion; they are frequently surrounded with a halo, like the *mica*, but differ in their figure, being sometimes spherical, and sometimes quadrangular. They are found in urine kept some time. This fluid is, after it has remained any length of time in the vessel, covered with a dark coloured pellicle, in which the little animals exist. In most cases a single drop of urine is fatal to animalcula, but the discovery of these prove that there are beings of a peculiar kind appropriated to and flourishing in it.

LANELLULA. Flat and transparent. Found chiefly in sea-water. Its colour is whitish, twice as long as it is broad, transparent, with a dark margin, the motion is vacillatory; it often appears as if it were double.

PULVISGULUS. Transparent, with a green margin. The animalcula of this species appear, when properly magnified, like spherical pellucid grains of different sizes; the circumference is green, and a green bent line passes through the middle of some of them, supposed to indicate that they are separating into two distinct animalcula. They rove about with a wavering motion, and are found early in the spring in marshy grounds.

UVA. Transparent and gregarious. The animalcula of this species, when collected in a heap, have a rotatory motion. The smaller particles separate from the larger, dividing, sometimes, into as many portions as there are constituent par-

ticles in the group, when separated they revolve with incredible swiftness. "To try," says Mr. Adams, "whether this group of animalcula was collected together by mere chance, or whether it was their natural state, the following experiment was made. A single corpuscle was taken the moment it was separated from the rest, and placed in a glass by itself; it soon increased in size, and when it had attained nearly the same bulk as the group from which it was separated, the surface began to assume a wrinkled appearance, which gradually changed till it became exactly similar to the parent group." The same process was again tried, and with similar success. It is found in a variety of infusions.

MONASABA, in *Geography*, a town of Hindoostan, in Oude; 25 miles E. of Mahomdy.

MONASERAI, a town of Hindoostan, in the circle of Sumbulpour; 10 miles S.E. of Sumbulpour.

MONASIO, a town of Italy, in the department of the Lario; 15 miles N. of Como.

MONASTEER, a town of Africa, built by the Arabs, on a peninsula, which advances into the sea; 50 miles S.E. of Tunis.

MONASTER, a town of Russian Poland, in the palatinate of Kiev; 40 miles E. of Bialacerkiev.

MONASTEREVEN, a post-town of Ireland, in the county of Kildare and province of Leinster. It is situated on the river Barrow, and the Athy branch of the grand canal passes very near it. It has a flourishing trade, and a considerable population. There was an abbey here, which after the suppression came into the Moore family. It still wears the venerable appearance, and retains the name of an abbey, and under the appellation of Moore abbey is the seat of the marquis of Drogheda. Monastereven is 30 miles S.W. from Dublin, and 10 N.W. from Maryborough.

MONASTERII PROVISOIR. See PROVISOIR.

MONASTEROLO, in *Geography*, a town of France, in the department of the Stura; three miles N.W. of Savigliano.

MONASTERY, a convent, or house built for the reception of religious; whether it be abbey, priory, nunnery, or the like.

MONASTERY is only properly applied to the houses of monks, mendicant friars, and nuns. The rest are more properly called *religious houses*.

For the origin of monasteries, see **MONASTIC** and **MONK**. The houses belonging to the several religious orders, which obtained in England and Wales, were cathedrals, colleges, abbeys, priories, preceptories, commanderies, hospitals, friaries, hermitages, chantries, and free chapels. These were under the direction and management of several officers. The dissolution of houses of this kind began so early as the year 1312, when the Templars were suppressed; and in 1323, their lands, churches, advowsons, and liberties, here in England, were given by 17 Edw. II. stat. 3. to the priory and brethren of the hospital of St. John of Jerusalem. In the years 1390, 1437, 1441, 1459, 1497, 1505, 1508, and 1515, several other houses were dissolved, and their revenues settled on different colleges in Oxford and Cambridge. Soon after the last period, cardinal Wolsey, by licence of the king and pope, obtained a dissolution of above thirty religious houses, for the founding and endowing his colleges at Oxford and Ipswich. About the same time a bull was granted by the same pope to cardinal Wolsey to suppress monasteries, where there were not above six monks, to the

value

MONASTERY.

value of eight thousand ducats a year, for endowing Windfor, and King's college in Cambridge; and two other bulls were granted to cardinals Wolsey and Caspiens, where there were less than twelve monks, and to annex them to the greater monasteries; and another bull to the same cardinals to enquire about abbeys, to be suppressed, in order to be made cathedrals. Although nothing appears to have been done in consequence of these bulls, the motive which induced Wolsey, and many others, to suppress these houses, was the desire of promoting learning; and archbishop Cramer engaged in it with a view of carrying on the Reformation. There were other causes that concurred to bring on their ruin: many of the religious were loose and vicious; the monks were generally thought to be, in their hearts, attached to the pope's supremacy; their revenues were not employed according to the intent of the donors; many cheats in images, feigned miracles, and counterfeit relics, had been discovered, which brought the monks into disgrace; the Observant friars had opposed the king's divorce from queen Catherine; and these circumstances operated, in concurrence with the king's want of a large supply, and the people's desire to save their money, to forward a motion in parliament, that, in order to support the king's state, and supply his wants, all the religious houses might be conferred upon the crown, which were not able to spend above 200*l.* a-year; and an act was passed for that purpose, 27 Hen. VIII. c. 28.

By this act about 380 houses were dissolved, and a revenue of 30 or 32,000*l.* a-year came to the crown; besides about 100,000*l.* in plate and jewels. The suppression of these houses occasioned great discontent, and at length an open rebellion; when this was appeased, the king resolved to suppress the rest of the monasteries, and appointed a new visitation; which caused the greater abbeys to be surrendered apace; and it was enacted by 31 Hen. VIII. c. 13. that all monasteries, &c. which have been surrendered since the fourth of February, in the twenty-seventh year of his majesty's reign, and which hereafter shall be surrendered, shall be vested in the king. The knights of St. John of Jerusalem were also suppressed by the 32 Hen. VIII. c. 24. The suppression of these greater houses by these two acts, produced a revenue to the king of above 100,000*l.* a-year, besides a large sum in plate and jewels. The last act of dissolution in this king's reign was the act of 37 Hen. VIII. c. 4. for dissolving colleges, free chapels, chantries, &c. which act was farther enforced by 1 Edw. VI. c. 14. By this act were suppressed 92 colleges, 110 hospitals, and 2374 chantries and free chapels. The number of houses and places suppressed from first to last, so far as any calculations appear to have been made, seems to be as follows:

Of lesser monasteries, of which we have the valuation	374
Of greater monasteries	186
Belonging to the hospitallers	48
Colleges	90
Hospitals	110
Chantries and free chapels	2374
Total	3182

Besides the friars' houses, and those suppressed by Wolsey, and many small houses, of which we have no particular account.

The sum total of the clear yearly revenue of the several houses at the time of their dissolution, of which we have any account, seems to be as follows:

	£	s.	d.
Of the greater monasteries	104,919	13	3½
Of all those of the lesser monasteries, of which we have the valuation	29,572	1	10½
Knights hospitallers head house in London	2,385	12	8
We have the valuation of only 28 of their houses in the country	3,026	9	5
Friars' houses, of which we have the valuation	751	2	0½
Total	140,784	19	3½

If proper allowances are made for the lesser monasteries, and houses not included in this estimate, and for the plate, &c. which came into the hands of the king by the dissolution, and for the value of money at that time, which was at least six times as much as at present; and we also consider that the estimate of the lands was generally supposed to be much under the real worth, we must conclude their whole revenues to have been immense.

It doth not appear that any computation hath been made of the number of persons contained in the religious houses.

Those of the lesser monasteries dissolved by 27 Hen. VIII. were reckoned at about	10,000
If we suppose the colleges and hospitals to have contained a proportionable number, these will make about	5,347
If we reckon the number in the greater monasteries, according to the proportion of their revenues, they will be about 35,000; but as probably they had larger allowances in proportion to their number than those of the lesser monasteries, if we abate upon that account 5000, they will then be	30,000
One for each chantry and free chapel	2,374
Total	47,721

But as there were probably more than one person to officiate in several of the free chapels, and there were other houses which are not included within this calculation, perhaps they may be computed in one general estimate at about 50,000. As there were pensions paid to almost all those of the greater monasteries, the king did not immediately come into the full enjoyment of their whole revenues: however, by means of what he did receive, he founded six new bishoprics, viz. those of Westminster, (which was changed by queen Elizabeth into a deanery, with twelve prebends and a school,) Peterborough, Chester, Gloucester, Bristol, and Oxford. And in eight other sees he founded deaneries and chapters, by converting the priors and monks into deans and prebendaries, viz. Canterbury, Winchester, Durham, Worcester, Rochester, Norwich, Ely, and Carlisle. He founded also the colleges of Christ-church in Oxford, and Trinity in Cambridge, and finished King's college chapel there. He likewise founded professorships of divinity, law, physic, and of the Hebrew and Greek tongues, in both the said universities. He gave the house of Grey Friars, and St. Bartholomew's hospital, to the city of London; and a perpetual pension to the poor knights of Windfor; and laid out great sums in building and fortifying many ports in the channel. It is observable, upon the whole, that the dissolution of their houses was an act, not of the church, but of the state; in the period preceding the Reformation, by a king and parliament.

ment of the Roman Catholic communion, in all points except the king's supremacy; to which the pope himself, by his bulls and licences, had led the way.

Although none, in this enlightened period, can approve either the original establishment or continued subsistence of monasteries; yet the destruction of them was felt and lamented, for a considerable time, as a great evil. One inconvenience that attended their dissolution was the loss of many valuable books, which their several libraries contained: for during the dark ages, religious houses were the repositories of literature and science. Besides, they were schools of education and learning; for every convent had one person or more appointed for this purpose; and all the neighbours that desired it might have their children taught grammar and church music there, without any expence. In the nunneries also young females were taught to work and read; and not only people of the lower rank, but most of the noblemen's and gentlemen's daughters were instructed in those places. All the monasteries were also in effect great hospitals, and were most of them obliged to relieve many poor people every day. They were likewise houses of entertainment for all travellers. And the nobility and gentry provided not only for their old servants in these houses, by corrodies, but for their younger children, and impoverished friends, by making them first monks and nuns, and in time priors and prioresses, abbots and abbeesses. On the other hand, they were very injurious to the secular and parochial clergy, by taking on themselves many prebends and benefices, by getting many churches appropriated to them, and pensions out of many others; and by the exemptions they got from the episcopal jurisdiction, and from the payment of tithes. Nor were they less injurious to the nation in general, by depriving the public of so many hands, which might have been very serviceable to it in trade and other employments; by greatly diminishing the number of people, in consequence of the institution of celibacy; and by their houses or churches being sanctuaries for almost all sorts of offenders. And if the superstition had continued, and the zeal of establishing religious institutions had exerted itself with equal vigour to the present age, we should ere this have been a nation of monks and friars, or probably have become a prey to some foreign invader. We say nothing now of the acts of moral turpitude, which were committed in these abodes of celibacy and indolence; which, however they might have been exaggerated, were without doubt flagrant and atrocious. See Tanner's *Notitia Monastica*; and for an abstract, Burn's *Eccl. Law*, art. *Monasteries*.

MONASTIC, something belonging to monks, or the monkish life.

The monastic profession is a kind of civil death, which in all worldly matters has the same effect with the natural death.

The council of Trent, &c. fix sixteen years for the age at which a person may be admitted into the monastical state.

St. Anthony is the person who, in the fourth century, first instituted the monastic life; as St. Pachomius, in the same century, is said to have first set on foot the cœnobitic life, *i. e.* regular communities of religious.

In a short time the deserts of Egypt became inhabited with a set of solitaries, who took upon them the monastic profession. (See *ANCHORET*, *HERMIT*, &c.) St. Basil carried the monkish humour into the East, where he composed a rule, which afterwards obtained through a great part of the West.

In the eleventh century, the monastic discipline was grown

very remiss. St. Odo first began to retrieve it in the monastery of Cluny: that monastery, by the conditions of its erection, was put under the immediate protection of the holy see, with a prohibition to all powers, both secular and ecclesiastical, to disturb the monks in the possession of their effects, or the election of their abbot. In virtue hereof, they pleaded an exemption from the jurisdiction of the bishop, and extended this privilege to all the houses dependent on Cluny. This made the first congregation of several houses under one chief immediately subject to the pope, so as to constitute one body, or, as they now call it, one *religious order*. Till then, each monastery was independent, and subject to the bishop. See **MONK**.

MONASTIER, in *Geography*, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Le Puy; 9 miles S.S.E. of Le Puy. The place contains 1766, and the canton 8255 inhabitants, on a territory of 197½ kilometres, in 9 communes.

MONASTIRSKA, a town of Russia, in the government of Tobolsk, on the Mura. N. lat. 57° 4'. E. long. 99° 24'.

MONATOO, a town of Bengal, in the province of Palamow, where is a passage across mountains to Koonda; 23 miles N.N.E. of Palamow.

MONAZZO, a town of Naples, in the province of Otranto; 14 miles S.E. of Tarento.

MONBACHIO, a town of Naples, in Principato Ultra; 15 miles E. of Conza.

MONBIN, or **MOMBIN**, in *Botany*, the French and Spanish name of a West Indian fruit, called by the English Hog Plum, *Spondias lutea*, Linn. Sp. Pl. 614; Monbin arbor foliis fraxini, fructu luteo racemoso; Plum. Nov. Gen. 44. t. 22. Madam Merian, who gives an excellent representation of this plant in her tab. 13. describes the fruit as of an astringent quality, but causing perspiration, which is of the same yellow colour as itself. See **SPONDIAS**.

MONBLANC, in *Geography, a town of Spain, in Catalonia, on the river Francoli; 17 miles N. of Taragon.*

MONBODDO, **LORD**, in *Biography*, so called according to the courtesy of the Scottish bar, and on this account he is more generally known by that title, than by his name of James Burnet, was born about the year 1714. He was educated at one of the Scotch universities, and paid a great attention to classical studies: but as soon as he had determined on the law as the future profession of his life, he passed through the ordinary course of juridical studies, and was, in the year 1737, admitted a member of the faculty of advocates at Edinburgh. His application to literary and juridical studies was almost incessant, and he acquired a high reputation for legal knowledge, as well as for an extensive acquaintance with the Grecian language and literature. In the year 1767 he obtained a judge's seat on the bench of the court of session, and performed with credit and honour the duties of that high office; inasmuch that it is recorded, that no sentence passed by him was ever reversed by the house of peers. In the course of his literary studies, he was led to attempt the composition of a work, that might raise his name to distinction among men of letters, the main object of which is to prove the superior wisdom of the ancients, compared with that of the moderns. The first volume of his intended work, entitled "The Origin and Progress of Language," was given to the public in 1773, which was followed, at different periods, by five other volumes. With the philosophical history of language was involved necessarily that of civilization and knowledge; and what the author wrote on these subjects was perused by critics

critics with sentiments of mingled respect, derision, and indignation. His lordship had, however, many advocates, whose zeal, to say the least, was in every respect equal to their knowledge and learning. Those who were partial to modern literature, says a biographer of lord Monboddo, on account of their ignorance of, and inability to enter into that of antiquity; or who, though not unacquainted with the more popular of the ancient authors, were, however, strangers to the deeper mysteries of Greek erudition, condemned lord Monboddo's work with bitter and contemptuous censure. The Scotch literati generally held the labours of their countryman in much disesteem; but in England its reception was more favourable to the author's expectations. Here were found some critics of universally acknowledged talents and profound learning, who, while they smiled at many of his strange notions and hypotheses, were willing to applaud him for the service he had done to the interests of learning. In the late Mr. Harris, the author of *Philosophical Grammar*, and other erudite works, he found an admirer and literary friend, who was exceedingly delighted to meet with a person that had cultivated those studies with an ardour equal to what he had himself bestowed on them, and who almost worshipped the excellence of the ancient Greeks, as far surpassing all other excellence. While lord Monboddo was proceeding in his publication of this work, he commenced the composition of a larger undertaking, with the express view of unfolding and vindicating the principles of Grecian philosophy. This work, entitled "*Ancient Metaphysics*," consisted of five volumes, quarto, of which the first was published in 1779, and the last appeared after the author's death. In this he vainly attempts to revive the absurd principles of the Aristotelian philosophy, and treats modern systems, not excepting that of the immortal Newton, with a sort of ridicule and contempt, that only exposed himself to well merited derision, or to the more worthy emotions of pity and compassion. Lord Monboddo's private life was spent in the practice of all the social virtues, and in the enjoyment of much domestic happiness. He married an amiable lady, by whom he had a son and two daughters; but of these joys in the cup of life, he was quickly bereaved by the loss of his son and wife,—afflictions which cut deep to the heart: but like a true philosopher, when he found sorrow of no avail, he roused himself to exertion, and called forth his Christian principles, which, in the midst of calamity, led him to trust and hope in him who gave, and who has a right to take away.

He was now offered, in addition to his place as judge in the supreme civil court in Scotland, a seat in the court of judicary, the supreme criminal court, on which he would have done the highest honour, compared with some of the men who have since sat there, and who will be everlastingly remembered for their sentences in the years 1793, 1794, &c. Though the salary of this office would have produced a convenient increase of his income, he was satisfied with his present emoluments, and refused to accept what had been offered, lest his business should too much detach him from his favourite studies. His patrimonial estate did not amount to more than a clear income of 300*l. per annum*, yet he would never raise his rents, supposing that he was by this means serving his tenants; an idea unquestionably founded in error. We have known many instances, in which land has been vastly improved, and tenants enriched, by demanding of them a rise in their rents, corresponding to the increased demands of the times. The error of lord Monboddo was, however, very venial: it originated from the best and most humane motives. He shewed, indeed, at no time a parti-

cular solicitude for any great improvement of his lands: his main object was, that the persons who lived on them should be amply supported by the produce. The vacation of the court of session afforded him leisure to retire every year, in the spring and autumn, to the country, where he was accustomed to dress in a style of simplicity, as if he had been only a plain farmer, and to live among the people upon his estate with all the kind familiarity and attention of a father among his children. In this state he had a visit from Dr. Samuel Johnson; and though, probably, no two persons could differ more than these, yet lord Monboddo was too hospitable to enter into any contentious discussions with a stranger in his own house. His lordship frequently visited London, during his vacations; to which city he was allured by the great number of men of profound erudition, whose conversation he had an opportunity of enjoying there. In all his journeys he was accustomed to ride on horseback, attended by a single servant. On his return from the last visit, which he made purposely to take leave of his friends, he was taken ill on the road, and would probably never have reached home, had not a friend overtaken him, and prevailed on him to travel the remainder of the way in his carriage. His lordship died in June 1799, in the 85th year of his age. Although rigidly temperate in his habits, he delighted much in the convivial society of his friends; and among these he could number all the most eminent characters in Scotland for virtue, literature, and real elegance of conversation. Of his various excellencies we have heard much from a noble lady, now herself no more, who never ceased to cherish his memory with respect and honour.

MONBRUN, in *Geography*, a town of Africa, in the kingdom of Hoval; 15 miles S.W. of Gourbel.

MONBUEY, a town of Spain, in the province of Leon; 30 miles S.W. of Astorga.

MONCADA, a town of Spain, in Catalonia; 8 miles N. of Barcelona.—Also, a town of Spain, in Valencia; 7 miles N.W. of Valencia. This town is now reduced to a village: it has a parish church, a convent of Dominicans, and a population of about 1000 inhabitants.

MONCALIER, a town of France, in the department of the Po, on an eminence near the river, containing two churches, several convents, and a royal palace; 4 miles S. of Turin.

MONCALVO, a town of Istria; 7 miles S. of Rovigno.—Also, a town of France, in the department of Marengo; 9 miles N. of Asti.

MONCAON, a small but fortified town of Portugal, in the province of Entre Duero e Minho, on the Minho; 25 miles N. of Braga. N. lat. 42°. E. long. 8° 10'.

MONÇARAS, a town of Portugal, in Alentejo, on the Guadiana, containing more than 1500 inhabitants; 25 miles E. of Evora.

MONCAYO, a town of Spain, in Aragon; 11 miles W. of Borja.

MONCHABOO, a town of the Birman empire, which was formerly its capital; 52 miles N. of Ava. N. lat. 22° 34'. E. long. 97° 40'.

MONCLAR, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban; 10 miles E.S.E. of it. The place contains 1776, and the canton 5267 inhabitants, on a territory of 150 kilometres, in 8 communes. N. lat. 43° 58'. E. long. 1° 40'.—Also, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Villeneuve-d'Agen; 7 miles west from it. The place

contains 2061, and the canton 8462 inhabitants, on a territory of 150 kilometres, in 10 communes.

MONCON, a town, with a castle, of Spain, in Aragon, on the river Cinca; 25 miles N.W. of Lerida.

MONCONTOUR, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Loudun; 7 miles S.S.W. of Loudun. The place contains 819, and the canton 7173 inhabitants, on a territory of 212½ kilometres, in 18 communes. N. lat. 46° 53'. E. long. 0° 4'.—Also, a town of France, in the department of the North Coasts, and chief place of a canton, in the district of St. Brienc; 10 miles S.S.E. of St. Brienc. The place contains 1685, and the canton 14,380 inhabitants, on a territory of 215 kilometres, in 11 communes.

MONCONYS, BALTHASAR DE, in *Biography*, a writer of travels, was born at Lyons, and received the early part of his education in the Jesuits' college of that city. The plague, which in 1628 desolated many countries, at this period, forced him to quit his native place; and he went to Spain, where he completed his studies at the university of Salamanca. He attached himself to mathematics, chemistry, and astrology; and in Portugal, which he visited, he gained considerable reputation by his facility in forming horoscopes. From Portugal he travelled into the East, for the purpose of increasing his knowledge in the occult sciences, as they were falsely called, and tracing the remains of the philosophy of Hermes Trismegistus, and Zoroaster. Discovering, perhaps, the vanity of the pursuit, he returned to France, and devoted himself to mathematical and physical studies, which engaged him in correspondence with most of the learned men of his time. He died at Lyons in 1665; soon after which his travels were published, in three volumes, quarto: they are said to contain many rare and very curious observations. Moreri.

MONCOORAH, in *Geography*, an island in the mouth of the Ganges, about twelve miles long, and three broad. N. lat. 22° 10'. E. long. 91° 10'.

MONCOQ, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors; 12 miles S.W. of Cahors. The place contains 1970, and the canton 10,804 inhabitants, on a territory of 205 kilometres, in 16 communes. N. lat. 44° 20'. E. long. 1° 17'.

MONCRIF, FRANCIS-AUGUSTIN PARADIS DE, in *Biography*, a French poet and polite writer, was born of a family in middle life, at Paris, in 1687. Though intended for a business suited to his rank in society, he devoted himself to literature, hoping to obtain the patronage of some person of consequence. One of his earliest compositions was an "Ode on the Death of Louis-le-Grand," by which he expected to conciliate the favour of the regent. But he did not excel in lyrics, and is chiefly distinguished by small theatrical pieces, complimentary verses, madrigals, and ballads, which the French call *romances*. He was an actor as well as a writer, read with grace, and acted in a very agreeable way in the dramatic interludes then in vogue, and thus rendered himself acceptable to the most cultivated societies; at the same time, by his discretion and good humour, avoided every thing that might give offence. He obtained the posts of private secretary to the count of Clermont, and reader to the queen, and was admitted to many honours in the court of Lewis XV. He did not live wholly to himself, but was liberal to his poor relations, zealous in the service of his friends, and grateful for past favours; an instance of which last quality he gave, in his request to be allowed to

follow into his retreat the count d'Argenson, who was exiled in 1757. Moncrif lived enjoying perfect health till a very short time before his death, which took place in 1770, when he had attained the age of 83. As an author, his principal productions are "Essai sur la Nécessité et sur les Moyens de plaire," which is a very instructive work on the art of becoming agreeable in society; "Les Abderites," a comedy; "Poesies diverses;" some dissertations; and several little dramatic pieces of the opera kind. His "Histoire des Chats" was a trifle of the sportive kind. His works have been published collectively in four volumes.

MONDA, or MUNDA, in *Geography*, a town of Spain, in Grenada, near which Cæsar gained a victory over the sons of Pompey; 23 miles W. of Malaga.

MONDAGELE, a town on the east coast of Ceylon; 28 miles S. of Trincooli.

MONDAHU, a river of Brazil, which runs into the Atlantic, S. lat. 3° 10'. W. long. 40° 46'.

MONDARA, a town of Nubia; 40 miles S.W. of Dekin.

MONDAY, PLOUGH. See PLOUGH.

MONDAY Bay, in *Geography*, a bay on the coast of Terra del Fuego, in the straits of Magellan, affording good anchorage in 20 fathoms; 15 miles S.E. of Cape Upright.

MONDEGO, a river of Portugal, which rises near Guarda, in the province of Beira, and discharges itself into the Atlantic, 12 miles S.W. of Montemor e Velho.

MONDEJAR, a town of Spain, in New Castile; 25 miles E. of Madrid.

MONDELLO, a town of Sicily, in the valley of Mazara; 8 miles N. of Palermo.

MONDIM, a town of Portugal, in the province of Beira; 10 miles S.S.E. of Lamego.

MONDINO, or in Latin MUNDINUS, in *Biography*, a physician deservedly celebrated in the dark ages, was born at Milan, according to Freind, and flourished early in the 14th century. He held the professorship of medicine at Bologna in the year 1316, and enjoyed an extensive reputation throughout Italy, then the great seat of science, for his medical skill. His principal claim to distinction, however, rests upon his zeal and success in the cultivation of anatomy, of which art he must be deemed the restorer, having been the first among the moderns who dissected human bodies. He was the author of a work, entitled "Anatomia omnium humani Corporis interiorum Membrorum," first printed at Pavia in 1478, and afterwards frequently republished, with various commentaries. It is a methodical treatise, very copious upon the subject of the viscera, in the description of which he introduced many original observations, but passes lightly over the subject of the nerves and blood-vessels. It abounds, however, with a multitude of errors, resulting from his attachment to the opinions of Galen and Avicenna, and is marked by the rudeness and inaccuracy of the times. Nevertheless, it conferred a real benefit on the infant science, and acquired such a high character for authority in Italy, that the statutes of Padua, and some other medical schools of Italy, prohibited the use of every other work, as a textbook for the students of anatomy: and it continued in this general estimation for nearly two centuries. Mundinus died at Bologna in 1325, or 1326, and was buried in the church of St. Vital. Freind's Hist. of Med. Eloy Dict. Hist.

MONDONEDO, in *Geography*, a town of Spain, in Galicia, 25 leagues N.E. of St. Jago, and at a similar distance W. of Oviedo, is surrounded by mountains; situated at the bottom of a hill, at the entrance of a fertile and pleasant valley, and in the midst of several springs and brooks, and separated by

the two rivers Sigto and Ruzos from its suburbs. It is the see of a bishop, suffragan of Compostella, and has seven churches, including the cathedral and convents, one chapter of canons, one seminary, one oratory, and two hospitals. The town, which is tolerably large, is encompassed by walls, and has five gates and two bridges. The houses are tolerably built, of good stone; the streets are rather narrow, but regular; the grand square is watered by a fountain, and many other fountains cool and cleanse the streets. The air is very salubrious. The population consists of 5600 persons. The place is defended by the castle of Castro Oro. The river Mino rises at a little distance north of this town.

MONDASEDO, *Sierra de*, a mountain of Galicia of great extent, occupying the whole extremity of the north-east of Galicia, towards the Asturian boundary to the east, and proceeding to the north as far as Cabo Ortegal, and to the west as far as the Atlantic ocean.

MONDONVILLE, JOHNS JOSEPH CASSANEA DE, in *Biography*, born at Narbonne in 1711, owes his reputation and his fortune to incessant diligence and toil, a great passion for his art, and a regular conduct. He at first acquired his reputation by the violin: he was the rival of the famous Guignon, who was at the head of his art. They executed together at the Concert Spirituel, and varied with great taste numerous favourite airs in duo, to the infinite satisfaction of the public. He is celebrated by the famous Le Cat of Roan, for producing the *sons harmoniques* upon his violin, of which art he seems to have been the first who distinguished himself.

He composed sonatas for the harpsichord, with an accompaniment *obligato* for the violin, which at one time were in high favour all over Europe. After this, motets for a single voice, accompanied by difficult lessons on the harpsichord, which gained him the place of master of the chapel royal. He directed the Concert Spirituel during many years with great reputation, and likewise composed several pieces for the opera, which had great success.

M. Laborde, from whom this article is extracted, has recorded his private character in a way that does his memory more honour, perhaps, than his compositions; which, though in great favour in these days at Paris, were always too much cast in a French mould to be equally admired elsewhere. His melody was national, but his accompaniments were spirited and ingenious. He died in 1772, at 61.

MONDOVI, in *Geography*, a town of France, in the department of the Stura, late capital of a small province in Piedmont, to which it gave name; situated at the foot of the Apennines, on a mountain near the river Ebro. It was erected into a bishopric by pope Urban VI. in 1388, under the archbishopric of Turin. Besides the cathedral, it has five parish churches, an university, twelve convents, and about 10,000 inhabitants. It was taken by the French, after a splendid victory, in 1796; 30 miles S. of Turin. N. lat. 44° 24'. E. long. 7° 56'.

MONDRAGON, a town of Spain, in the district of Guipuscoa, in the province of Biscay, near which are medicinal springs, and a mine of excellent iron; 24 miles S.S.W. of St. Sebastian.

MONDRAGONE, a town of Naples, in Lavora, near the sea-coast, celebrated on account of its medicinal baths; 13 miles N.W. of Capua.

MONDUKOLSKOI, a town of Russia, in the government of Irkutsk, on the borders of China. N. lat. 50° 8'. E. long. 103° 24'.

MONEAH, a town of Hindoostan, in Bahar, on the right bank of the Ganges; 17 miles W. of Patna.

MONÉBA, a town of Africa, in Calbari, on the Camaroon. N. lat. 3° 40'.

MONEDA, a town of Sweden, in the province of Smolnd; 14 miles N.W. of Wexio.

MONEDULLA, JACKDAW, in *Ornithology*, a species of *Coccyz*; which see.—Also, a species of *Crotophaga*. See *CYPTOMYGA Ani*.

MONÉER, in *Geography*, a town of Hindoostan, in Bahar; 23 miles N.W. of Saferam.

MONÉGAL, a town of Hindoostan, in Golconda; 33 miles S. of Combanet.

MONÉGLIA, a town of the Ligurian republic; seven miles W. of Brugnato.

MONÉINS, a town of France, in the department of the Lower Pyrenees, and chief place of a canton, in the district of Oleron; 9 miles W. of Pau. The place contains 5550, and the canton 11,004 inhabitants, on a territory of 157½ kilometres, in 7 communes.

MONEMERION, ΜΟΝΕΜΑΙΩΝ, among the ancient Romans, a show, according to some, wherein none but tame bealls were exposed to view.

Others will have it to be a show of one day's continuance.

MONESTIER, in *Geography*, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Briançon; 13 miles N.W. of Gap. The place contains 2708, and the canton 4736 inhabitants, on a territory of 212½ kilometres, in three communes.

MONESTIEN-DE-CLERMONT, a town of France, in the department of the Here, and chief place of a canton, in the district of Grenoble; 16 miles S. of Grenoble. The place contains 509, and the canton 4258 inhabitants, on a territory of 355 kilometres, in 10 communes.

MONESTIES, a town of France, in the department of the Tarn, and chief place of a canton, in the district of Alby; 9 miles N. of Alby. The place contains 1210, and the canton 8101 inhabitants, on a territory of 250 kilometres, in 18 communes.

MONETA, or JUNO MONETA, in *Mythology*, the goddess of money, who had a temple at Rome, is represented upon medals with the instruments of coinage, the hammer, the anvil, the pincers and the die, with the Latin word "moneta." Others say, that this name is formed from *monco*, I warn or advise, because a little before the Gauls besieged Rome, she had warned the people to buy a sow big with young, an etymology that is supported by the authority of Cicero: "Junonem appellatam monetam, a moneo videlicet verbo, denominatam." See MONEY.

MONETÆ PES. See PES.

MONETAGIUM, MONETAGE, or *Mintage*, the right or privilege of coining money.

MONETALES TRIUMVIRI. See TRIUMVIRI.

MONETARIUS, or MONEYER, a name which antiquaries and medallists give to those who struck the ancient coins or monies.

Many of the old Roman, &c. coins have the name of the monetarius, either written at length, or at least the initial letters of it. See MEDAL.

MONETIA, in *Botany*, received its name from L'Heritier, in compliment to the celebrated J. B. de Monet, Chevalier de Lamarck; see LAMARCKIA.—L'Herit. Stirp. Nov. I. t. I. Schreb. 81. App. 813. Willd. Sp. Pl. v. 1. 669. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 264. (Azima; Lamarck Dict. v. 1. 343. Illustr. t. 807. Juss. 425.)—Clas and order, *Tetrandria Monogynia*, L'Herit. (*Dissecta Tetrandria*, Schreb. 813.) Nat. Ord. uncertain.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, swelling, permanent, cloven into four, lanceolate, acute, reflexed segments, two of which are deeper than the rest. *Cor.* Petals four, linear, acute, recurved, longer than the calyx. *Stam.* Filaments four, erect, inserted into the receptacle, almost as long as the corolla; anthers ovate, incumbent. *Pist.* Germen superior, nearly square, terminating in a thickish, conical style, shorter than the stamens; stigma acute. *Peric.* Berry? juiceless, globular, with a little point, surrounded by the calyx, of two cells? *Seeds* solitary, flat on one side, convex on the other.

Obs. The flowers are occasionally trifold or bifid.

Ess. Ch. Calyx inferior, four-cleft. Corolla of four petals. Berry? of two cells. Seeds solitary.

1. *M. barlerioides*. Four-spined Monetia. L'Herit. Stirp. Nov. t. 1. Willd. Thunb. Prodr. 28. (*Azima tetracantha*; Lamarck Dict. v. 1. 343. *Lycium indicum spinis quaternis ad foliorum singulorum exortum*; Seb. Thef. v. 1. 21. t. 13. f. 1.)—Spines four. Leaves smooth on both sides. Native of India, and the Cape of Good Hope. It flowers in the stove about August or September. This is a middling-sized spinous shrub, resembling *Barleria hystrix* in habit. *Root* perennial, woody, branched, cracked, with the taste of liquorice. *Stem* erect, full of chinks, ash-coloured. *Branches* opposite, diffuse, dense; the smaller ones prickly, deflexed, square, green at first, afterwards greyish. *Shoots* green, naturally downy, but becoming smooth by culture. *Prickles* four together, crossing each other horizontally, awl-shaped, sharp-pointed, withering at the tip, with one internal streak, about half as long as the leaves. *Leaves* opposite, on very short stalks, spreading, ovate, pointed, entire, ribbed. *Flowers* axillary, on the young shoots, about three in a cluster, sometimes solitary, sessile and herbaceous. *Braçtes* two-leaved, opposite, adhering to the flowers laterally, very narrow, acute, changing into prickles.

2. *M. diacantha*. Two-spined Monetia. Willd. (*Azima diacantha*; Lamarck Dict. v. 1. 343. *Amaranthoides indicum verticillatum parietariæ hirsutis foliis, spinosum*; Pluk. Alm. t. 133. f. 3. Tsjerou-Kára; Rheed. Hort. Malab. v. 5. 73. t. 37.)—Spines two. Leaves downy beneath. Native of India.—This is an evergreen shrub, rising to the height of six feet, with a thickish stem, and numerous ash-coloured branches, which are very spinous. *Leaves* two or three together, almost sessile, roundish-oblong, thick, close; dark green, smooth and shining above, paler and hairy beneath. *Flowers* axillary, at the base of the spines, small and greenish. The whole herb has a bitter flavour.

Mr. Dryander, in his remarks on Professor Gmelin's edition of the *Système Naturel*, Linn. Trans. v. 2. 221, observes "that *Azima nova* he supposes is meant for *Azima tetracantha* of Lamarck. *A. diacantha* being only taken from Plukenet's figure, is consequently doubtful."—We have however retained it after the example of Willdenow, relying upon the accuracy of Rheede's description and figure.—Kanden-Kára; Rheed. Hort. Malab. v. 5. 71. t. 36, seems undoubtedly of this genus, and perhaps merely a variety of *diacantha*.

Schreber, on revising this genus, has removed it from *Tetrandria* to *Dioecia*, a measure, of which we do not see the propriety, both organs being present in all the flowers, though, as it appears, each is occasionally defective.

MONETOU ISLANDS, in *Geography*, two islands in lake Michigan. N. lat. 44° 50'. W. long. 85° 28'.

MONEY, in *Commerce*, is a general term for coin, paper, or any other measure of value, or representative of property, that passes current from hand to hand as a circulating medium. See BANK, CASH, CIRCULATION, COIN, CURRENCY,

EXCHANGE, PAPER Money, and POLITICAL Economy. For an accurate definition of money, see the next article.

The origin of money seems to have been coeval with the first regulations of civil society, or at least it is too remote to be traced by any authentic history. The invention of this common measure, or standard, according to which all other things should be estimated, is ascribed by some persons, on the authority of Josephus, to Cain; although the first information that has been transmitted concerning it, originates with the patriarch Abraham, who paid 400 shekels for a burying place. The Greeks refer the invention of money to Hermodice, wife of king Midas; and the Latins to Janus. Barter, that is the exchange of one commodity for another, was the ordinary mode of traffic in the earlier periods of the world: thus we find in Homer, that Glaucus's golden armour was valued at 100 oxen, and Diomedes's armour at 10. This method, which still obtains among savage nations, must have been found extremely inconvenient in the early ages of commerce, and hence the necessity of adopting some commodity of general utility and demand as a measure of value. This necessity and its expedient are well explained by Aristotle in his Politics (book i. chap. 6.) "All useful things," says the philosopher, "could not, without great difficulty, be transported from place to place, it was resolved, by common consent, that in bartering commodities, they should reciprocally give and receive some substance, which, being in its nature applicable to the purposes of life, might, at the same time, be easily carried about."

The substance which has been adopted as a circulating medium, or measure of value, has been various in different ages and countries. In Italy it was originally cattle, if we may judge from the Latin word *pecunia*, money, which is said to be derived from *pecus*, a herd or flock. Thus Scaliger says, "à pecu formatur pecunius, unde pecunia: sub-intelligatur res vel quid simile, et sicut veterum divitiarum consistebant in copia pecudis, ita moneta pecudis effigie primùm notata fuit. Et apud Athenienses nummi figurâ boum signati fuerunt." Pliny says, that money was called *pecunia*, because their first coin was stamped with the figure of a cow. The Latin word *moneta* for money is however probably more modern than *pecunia*, and is said to be derived from *moneo*, to advise or mark, that is, to shew by some mark the weight and fineness of the metal of which coins were composed. Thus, according to Isidorus, "Moneta ita appellatur, quia monet nê qua fraus in pondere vel metallo fiat." In favour of this etymology, Suidas observes, that when the Romans were in want of money, Juno admonished them to practise justice, and then there would be no want of money; and when they had found the good effect of this counsel, she was surnamed Juno Moneta, and money was coined in her temple. In process of time, money was made a goddess, and enshrined by the name of *Dea Pecunia*, under the figure of a woman holding a balance in one hand, and a cornucopia in the other.

In all nations where commerce has made any considerable progress, the precious metals, either in coins or ingots, or their representative value in paper, have been adopted as money. Other substances, however, are still used for this purpose in different countries, especially for the common or inferior purposes of trade, as cowries or small shells in India, and salt bricks, and beads, in Abyssinia. See COIN, and the sequel of this article.

As we have already given an account of the progress and present state of metallic monies under the article COIN, and of monies of exchange under the head EXCHANGE, it remains here to explain what is to be understood by monies of

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of account, and to state their names in different countries, and also their value compared with sterling.

Money is distinguished into real and imaginary. By real money is understood coin, or any other circulating medium, and by imaginary, or ideal money, a nominal sum, which is not represented by any piece or coin, but which is used in keeping accounts, as the pound sterling, the livre Tournois, &c.

Imaginary monies have had their origin, for the most part, in real coins, or in weights. These units, which were originally adopted as measures of value, have been always continued under the same denomination, notwithstanding the fluctuations which may have taken place in the prices of metals, or of merchandize. There are, however, imaginary monies which have not thus originated, but have been contrived for the purpose of simplifying accounts, as the centimes of France, and the cents in America. It should, however, be observed, that all monies of account are not imaginary, nor are they, in all places, the monies of exchange, but they are most generally so.

In order to understand the monies of account in the following table, some preliminary explanations may be necessary.

Monies are distinguished in different countries by particular denominations, as *specie effective*, *currency*, *banco*, *giro*, *moneta di cambio*, *cash*, *valuta*, &c.

Specie and *effective* generally mean coin, but in Germany the word *specie* is applied to the rix-dollar and its divisions, as coined after the rate of the empire.

Currency mostly signifies the common or current money of a place, which, in Holland, is called *casfe*, in Venice *moneta piccola*, and in other parts of Italy *moneta lunga*; but in some parts of Germany, and particularly in Augsbourg, *currency* means money of account, and it has the same meaning in America and the West Indies, where it derives its name from a paper currency which has been long depreciated and discontinued.

Banco is the money which is placed in banks of deposit,

and which is not drawn out, but transferred from one person to another, in the payment of debts and contracts.

Giro, in most parts of Germany, means money of exchange, which in Italy is called *moneta di cambio*.

Cash generally means real money, but in Hanover the term is applied to a certain superior kind of money used for large payments, as distinguished from another sort, used in inferior departments of business, called, *old value*. The word *cash* is likewise applied to a small coin in China, and in some parts of India beyond the Ganges.

The word *valuta* or *valcur*, is applied in most parts of the continent of Europe to the prices or rates at which different kinds of monies are reckoned in commercial transactions.

The difference of one sort of money compared with another is mostly reckoned at so much *per cent.* When a better sort is given for a worse, the premium or per centage is called *agio*. But when the difference or per centage is considered with regard to the inferior sort of money, it is called *discount*. *Discount* is likewise a term applied to an allowance of so much *per cent. per annum* for the payment of money before it becomes due, and this discount differs from the former as *agio* differs from *interest*.

Interest is an allowance of so much *per cent. per annum* for the use of money, and is therefore an addition to the principal, but *agio* adds nothing to the capital, being only the actual difference in value. In the same manner discount between different sorts of monies, and discount for prompt payment differ; in the former case there is no loss nor diminution, but in the latter there is a deduction from the principal. See AGIO, INTEREST, and DISCOUNT.

The following table, which we extract, by permission, from the Universal Cambist, will shew the value of the principal monies of account of the chief trading places, in sterling, according to the mint regulations of those countries compared with the mint laws of England; and though most of the monies are imaginary, yet, as they represent certain sums of coined money, their value is thence easily known.

TABLE of Monies of Account, containing the Value of the Monies of Account of different Places (expressed in Pence and Decimals of Pence), according to the Mint Price both of Gold and Silver in England; that is, 3*l.* 17*s.* 10½*d.* per Oz. for Gold, and 5*s.* 2*d.* per Oz. for Silver.

			Value in Silver.		Value in Gold.	
			<i>d.</i>	<i>dec.</i>	<i>d.</i>	<i>dec.</i>
Aix la Chapelle	-	Rixdollar Current	31	40	31	43
Alicant	-	Libra or Peso	39	40	37	38
Amsterdam	-	Rixdollar Banco (agio at 4 <i>per cent.</i>)	54	64	variable*	
		Florin Banco	21	85	ditto	
		Pound Flemish Banco	131	10	ditto	
		Rixdollar current	52	54	ditto	
		Florin current	21		ditto	
		Pound Flemish current	126		ditto	
Antwerp	-	Pound Flemish (money of exchange)	123	25	123	87
		Florin (money of exchange)	20	54	20	64
		Pound Flemish current	105	65	106	18
		Florin current	17	60	17	70
Arragon	-	Libra Jaquesa	49	25	46	75
Augsbourg	-	Florin Giro, or money of exchange	32		32	83
		Florin current	25	20	25	07
Barcelona	-	Libra Catalan	28	14	26	70
Basil	-	Rixdollar, or Ecu of exchange	47	27	47	
		Rixdollar current	42	45	42	20

* In the places marked *variable*, the price of the coins is not fixed; and, therefore, the intrinsic value in gold of the monies of account cannot be ascertained for any length of time.

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				Value in Silver.		Value in Gold.	
				d.	dec.	d.	dec.
Bergamo	-	-	Scudo of 7 Lire	35	67	36	50
Berlin	-	-	Pound Banco	47	25	variable	
			Rixdollar current	36		ditto	
			Rixdollar in Fredericks		*	39	68
Bern	-	-	Ecu of 3 Livres	42	64	42	90
			Crown of 25 Batzen	35	53	55	75
Bologna	-	-	Lira corrente	10	86	10	62
			Lira money of exchange	11	12	10	89
Bolfano	-	-	Florin Giron, or money of exchange	33	26	33	08
			Florin moneta lunga, or currency	25	20	25	06
Bremen	-	-	Rixdollar current	37	80	variable	
			Rixdollar in Carls d'or			39	68
Canary Islands	-	-	Real current	3	95	3	66
Cassel	-	-	Rixdollar current	37	80	variable	
Cologne	-	-	Rixdollar specie of 80 Albufes	31	38	ditto	
			Rixdollar current of 78 Albufes	30	60	ditto	
Constantinople	-	-	Piaſtre, or Dollar	13	12	uncertain	
Dantzic	-	-	Gulden or Florin	9		9	
Denmark	-	-	Rixdollar specie	54	72		
			Rixdollar Sundiſh ſpecie	53	21		
			Rixdollar Crown money	48	37		
			Rixdollar Daniſh currency	44	27	44	88
			Rixdollar Holſtein currency	43	78	44	16
England	-	-	Pound ſterling	240		240	
Florence	-	-	Lira	8	10	8	53
			Ducat, or Crown current	56	70	59	71
			Scudo d'oro, or Gold Crown			63	97
France	-	-	Livre Tournis	9	54	9	38
			Franc (new ſyſtem)	9	70	9	52
Francfort	-	-	Rixdollar Convention money	37	80	37	65
			Rixdollar Muntze, or in ſmall coins	31	50		
Germany	-	-	Rixdollar current	37	80	variable	
			Rixdollar ſpecie	50	40	ditto	
			Florin of the Empire	25	20	ditto	
			Rixdollar Muatze	31	50	ditto	
			Florin Muntze	21		ditto	
Geneva	-	-	Livre current	16	13	16	93
			Florin	4	60	4	84
Genoa	-	-	Lira fuori Banco	7	99	7	83
			Pezza, or Dollar of exchange	45	94	45	02
			Scudo di cambio, or Crown of exchange	36	75	36	02
			Scudo d'oro marche	85	49	83	77
Hamburgh	-	-	Mark Banco (at a medium)	18	22	variable	
			Pound Flemiſh Banco	136	65	ditto	
			Mark current	14	82	ditto	
			Pound Flemiſh current	111	15	ditto	
Hanover	-	-	Rixdollar, <i>in caſh</i>	42		42	26
			Rixdollar, <i>gold value</i>	39		39	24
Ireland	-	-	Pound Iriſh	221	56	221	56
Konigsberg	-	-	Gulden or Florin	12		variable	
Leghorn	-	-	Pezza of 8 Reals	46	75	49	16
			Lira moneta buona	8	13	8	55
			Lira moneta lunga	7	79	8	19
Leipſic	-	-	Rixdollar convention money	37	80	variable	
			Rixdollar in Louis d'or or Fredericks			39	68
Lucca	-	-	Lira	7	40	7	77
			Scudo d'oro	55	50	58	27
			Scudo corrente	51	80	54	39
Malta	-	-	Scudo or Crown	21	32	23	34

* Where the columns are marked with a daſh, it is to be underſtood that there is no coin in the metal of that column by which the monies of account can be computed.

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			Value in Silver		Value in Gold	
			d.	dec.	d.	dec.
Milan	-	Lira Imperiale	10	41	10	53
		Lira corrente	7	36	7	44
		Scudo Imperiale	60	90	61	60
		Scudo corrente	42	32	42	78
Modena	-	Lira	3	82		
Munich	-	Gulden or Florin	21		21	28
Nancy	-	Livre (money of Lorraine)	7	38	7	26
Naples	-	Ducat regno	40	80	uncertain	
Navarre	-	Real	4	92	4	67
		Libra	8	21	7	79
Neufchatel	-	Livre Tournois	13	63	13	40
		Livre foible	5	45	5	36
Novi	-	Scudo d'oro marche	85	49	83	77
Parma	-	Lira	2	45	2	40
Perfia	-	Toman of 100 Mamoodis	287	60		
Poland	-	Gulden or Florin	6	03	6	27
		Milree	68	75	67	34
Portugal	-	Old Crusade	27	50	26	94
		(See Vienna.)				
Prague	-	Rixdollar Alberts	52	54	variable	
Riga	-	Rixdollar currency (agio at 40 per cent.)	37	53	ditto	
Rome	-	Scudo or Crown	52	05	51	63
		Scudo di Stampa d'oro	79	37	78	73
Russia	-	Ruble	38	50	30	35
St. Gall	-	Florin, money of exchange	27	44	variable	
		Florin current	22	76	ditto	
St. Remo	-	Lira	8	46	8	90
Sardinia	-	Lira	18	21	18	82
Sicilly	-	Ounce	122	54	124	80
		Scudo or Crown	49	02	49	92
Spain	-	Real of old plate	4	93	4	57
		Real of new plate	5	24	4	86
		Real of Mexican plate	6	55	6	07
		Real Vellon	2	62	2	43
		Dollar of old plate or of exchange	39	45	36	59
Stralsund	-	Rixdollar of account	28	35	variable	
		Pomeranian Gulden	14	18	ditto	
Strafburg	-	Livre and Franc (see France.)				
		Florin	19	08	18	76
Sweden	-	Rixdollar	55	41	56	43
Switzerland	-	Franc (new system)	22	14		
Trieste	-	Florin, Austrian currency	25	20	25	05
		Lira, Trieste currency	4	76	4	73
		Lira di piazza	4	65	4	63
Turin	-	Lira	11	28	11	23
Valencia	-	Libra	39	45	36	59
Venice	-	Lira piccola (in the old coins)	5	07	variable	
		Lira piccola (in the coins introduced by the Austrians)	4	25	ditto	
Vienna	-	Florin	25	20	25	05
Zant	-	Real	4	06	variable	
Zurich	-	Florin, money of exchange	25	85	ditto	
		Florin current	23	50	ditto	

From the above table the Intrinsic Par of exchange may be computed where the monies of account and of exchange are the same; but for a more systematic and comprehensive statement of the par, both according to assays and mint regulations; see EXCHANGE.

We shall here subjoin some additions to the historical part of the present article, as well as to that of COIN and COINAGE, to which the reader is referred.

Among the ancient Britons, iron rings, or, as some say, iron plates, or tin plates and rings, were used for money. Among the Lacedæmonians, iron bars were quenched with vinegar, thus intending that they should not serve for any other use. Seneca observes, that there was anciently stamped money of leather, *corium forma publica impressum*; and the same thing was put in practice by Frederic II. at the siege of Milan; to say nothing of an old tradition among

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among ourselves, that, in the confused time of the barons wars, the like was done in England. In 1360, king John of France, who agreed to pay our Edward III. for the ransom of his person 3,000,000 of gold crowns, was reduced to the necessity of paying for the necessaries of his household in leather money, in the middle of which there was a little nail of silver. The Hollanders, we know, coined great quantities of pasteboard in the year 1574. Numa Pompilius made money of wood and leather; nor does it appear that the Romans were much acquainted with the art of striking money in metal during the time of their kings. There is reason to believe, that both gold and silver money were very early in use in Egypt and Asia, and thence soon afterwards introduced into Carthage and Greece. From Greece it was brought to Rome, and thence gradually westward into all the Roman provinces.

The first shape, says Mr. Pinkerton, in which money appeared, was that of pieces of metal without any stated form or impression, but merely regulated to a certain weight; for *weight* was the grand standard of ancient coinage, so that all large sums were paid in weight even down to the Saxon period of England. With us weight is now applied to each particular piece, and that only in gold: whereas, with the ancients, weight was applied to the sum total; to silver as well as gold; nay, in some instances, to brass. In Greece large sums were referred to so many "Mnæ," or "Minæ," and also to the larger denomination of so many "Talents." (See MINA and TALENT.) As in Greece the first estimation of money was merely by weight, this was likewise the case in Rome. Silver was the metal first used in Grecian coinage, but copper in the Roman; the former metal having been long unknown to the Romans. The first valuation of Roman money was by the "libra gravis æris," or pound of heavy brass; and when by the progress of their conquests they obtained silver and gold, these were regulated in the same manner. The common Roman pound, yet used at Rome, consisted of 12 ounces of 458 grains each, equal to our ounce avoirdupois; but the money ounce seems to have had only 420 troy grains, and the pound 5040. This was the standard of copper; and when silver came to be coined, seven denarii went to the ounce, as in Greece eight drachms: the gold was regulated by the scriptulum, scrupulum, scruple, or third part of a denarius, and by the larger weights just mentioned. (See DENARIUS, ÆS, and SESTERTIUS.) Money in old Rome, when rising to a high sum, was estimated not by the talent, a term unknown to the Romans, but by the hundred weight of brass, called "Pondus" by way of eminence. See SESTERTIUM.

As to the origin of the Roman coinage we may observe, that the states adjoining to Latium, and from which most probably the form of the first Roman coinage was derived, were, on the N. and W. the Etruscans; and upon the S. and E., at a great distance, the Grecian colonies in Magna Græcia and Sicily. To the Etruscans Mr. Pinkerton ascribes the origin of the Roman coinage, and not to the Grecian colonies, or to the Sicilians. (See LIBRA.) The first Roman coinage, according to Pliny and other respectable authors, took place in the reign of Servius Tullus in the year 460 B.C., or according to the common calculation 550 years B.C. The coinage of Tullus seems to have been confined to the As, Æs, or piece of brass only. (See As.) The largest imperial brass coin was a piece of the value of two-pence English, called "Sestertius;" which see. Before the time of the first Cæsar, as Mr. Pinkerton thinks, yellow brass began to be used in

the Roman coinage, and this was always considered as double in value to the Cyprian, or copper. From Augustus downward, the large brass were all of the yellow sort, and not one of them copper. The largest of those that are called the middle size were likewise all of yellow brass; and that of the next size, which is the As, weighing the half ounce, is universally copper. The orichalcum, or what we term brass, was by the ancients held in far superior esteem to copper, or the "Æs Cyprium." It is observed, that all the large brass coins were of yellow metal, and the middle brass yellow, or red; but the former were always of the finest workmanship. The rust, with which time covers them, has confounded them together, and our putting little more value on brass than on copper hath confirmed the deceit, whereas the ancients put double the value on brass that they put on copper; but the large brass should not be taken for copper, because they sometimes have now a copper hue: before the person who examines can decide, he must always scrape the side of the metal; and he will thus learn that the ancient coinages of brass and of copper were kept as distinct as those of gold and silver. (See SESTERTIUS.) Under Valerian and Gallienus, there appeared a new coinage of copper mixed with silver. Coins of this sort are just the size of the denarius; and, indeed, they are the "denarii," or "philippeï ærei." See DENARIUS and FOLLIS. For an account of the silver coinage of Rome; see DENARIUS.

The gold coinage of Rome took place, according to Pliny, sixty-two years after silver, that is, in the 547th year of the city, by vulgar account, or 204 B.C. At that time the scruple, which even now remains, passed for 20 sesterces. Afterwards it was thought proper to coin 40 pieces out of the pound of gold; and by degrees this weight was diminished to 45 in the pound. See SCRUPLE.

The aureus, or common gold coin, in the first coinage was worth 30 silver denarii, equal to 1*l.* sterling; gold being to silver as 17½ to 1. It thus continued till Sylla's time, when it weighed no less than 166 grains at an average, or 30 in the pound of gold. About the year of Rome 675, 77 years B.C., the aureus fell to the rate of 40 to the pound, and passed for 20 denarii. In the reign of Claudius the aureus went for 100 sesterterti, or 25 silver denarii; at which rate it remained. The aureus fell by degrees to 45 in the pound, or about 110 grains of medial weight each, and continued of this standard till the time of Elagabalus, when it fell to about 92 grains at an average, or near 55 in the pound. Under Philip aurei of two or three sizes appear, of a rude fabric, and having a head of Rome on one side, and various reverses; and this practice of making different sizes of gold coins continued, so that under Valerian I., Gallienus, and his successors, five or six sizes occur. That the aureus went for 25 silver denarii down to Alexander Severus is clear, but the value of these different sizes does not appear. Supposing that standard to remain till the time of Constantine I. the double aureus will have borne 50 silver denarii, and the aureus 25. The "triens" must have had eight silver denarii, and two denarii ærei; the double triens twice as much. The denarius was not then worth above 1*4s.* English. Under Aurelian and his successor Probus, the aureus was of 100 grains; and there were also halves of about 50 grains, and double aurei, upwards of 200 grains, of very fine workmanship. Down to Constantine I. the aureus stood at between 80 and 70 grains. This prince, without altering the size of the coin, introduced, instead of the aureus, the solidus of 6 in the ounce of gold, and to pass for 14 of his

new silver coins, called *Milliarenses*, and 25 *denarii* as before; gold being to silver about 13 to 1. The *solidus*, or chief gold coin, continued of the same standard to the close of the Byzantine empire; for gold was common in Constantinople, while silver became more and more scarce. The *solidus* was worth 12*l.* sterling. See *SOLIDUS*.

In the first gold coinage at Rome, the *aureus* was divided into four inferior parts; the *semissis*, or half, of 60 *sestertii*; the *tertius*, or third, of 40; the fourth, of 30; and the sixth, or *sextupulum*, of 20. But soon after all these subdivisions were discontinued, except the *semissis*, or half; which occurs in the consular times, and in those of some emperors, but is extremely scarce, so that few of them must have been struck. Some have supposed, without sufficient authority, that the Romans called the gold *semissis* a *denarius aureus*. *Denarius* was used, as our penny, for a coin. The common *aureus* was called *denarius aureus* very naturally, because it was of the same size with the silver *denarius*. See *AUREUS*.

With regard to the materials of English money, see *COIN*.

As for the *impression* of money, the Jews, though they detested images, yet stamped on the one side of their shekel, the golden pot which had the manna; and on the other, Aaron's rod; the Dardans, two cocks fighting; Alexander, as is held by some, his horse Bucephalus; though this may be doubted of, because the horse is found as frequently on the coins of several of the kings of Macedonia, his predecessors, as his. The Athenians stamped their coins with an owl, or an *ex*; whence the proverb on bribed lawyers, *bor in lingua*; the people of *Ægina* with a tortoise; whence that other saying, *Virtutem & sapientiam vincunt testudines*. As to the Romans, the monetarii sometimes impressed the images of men that had been eminent in their families, on their coins; but no living man's head was ever stamped on the Roman coin till after the fall of the commonwealth; after that time they bore the emperor's head on one side; and, from this time, the practice of stamping the prince's image on coins has obtained among all civilized nations, the Turks and other Mahometans excepted; who, in detestation of images, inscribe only the prince's name, with the year of the transmigration of their prophet.

For an account of the impression of British money, see *COIN*.

As to the *figure* of money, it is either round, as in England; multangular, or irregular, as in Spain; square, as in some parts of the Indies; or nearly globular, as in most of the rest.

After the arrival of the Romans in this island, the Britons imitated them, coining both gold and silver with the images of their kings stamped on them; when the Romans had subdued the kings of the Britons, they also suppressed their coins, and brought in their own, which were current here from the time of Claudius to that of Valentinian the Younger, this being about the space of five hundred years.

Mr. Camden observes, that the most ancient English coin he had known, was that of Ethelbert, king of Kent, the first Christian king in the island; in whose time all money accounts began to pass by the names of pounds, shillings, pence, and mancus.

The penny seems borrowed from the Latin *pecunia*, or rather from *pendo*, on account of its just weight, which, till Edward III.'s reign, contained as much silver as about three-pence of our money: these were coarsely stamped with the king's image on one side, and either the mint mas-

ter's name, or the city's where it was coined, on the other: five of these pence made their scilling, probably so called from *scillingus*, which the Romans used for the fourth part of an ounce; forty of these scillings made their pound, and four hundred of these pounds were a legacy, or a portion for a king's daughter; as appears by the last will of king Alfred.

By these names they translated all sums of money in their old English testament; talents by *pence*; Judas's thirty pieces of silver by *thirty scillings*; tribute-money, by *penning*; and the mite by *scorthing*.

But it must be observed they had no other real money, but pence only; the rest being imaginary monies, *i. e.* names of numbers, or weights: thirty of these pence made a mancus, which some take to be the same with a mark; mancus, as appears by an old MS., was *quinta pars uncie*. These mancus, or mancusæ, were reckoned both in gold and silver; for in the year 680, we read, that Ina, king of the West Saxons, obliged the Kentish men to buy their peace at the price of thirty thousand mancus of gold. In the notes on king Canute's laws, we find this distinction, that *mancusæ* was as much as a mark of silver; and *manca*, a square piece of gold, valued at thirty-pence. See *MANCUS*.

The Danes introduced a way of reckoning money by ores, *per oras*, mentioned in Domesday book; but whether they were a distinct coin, or a certain sum, does not plainly appear: this, however, may be gathered from the abbey-book of Burton, that twenty ores were equivalent to two marks.

They had also a gold coin called *byzantine*, or *bezant*, as being coined at Constantinople, then called *Byzantium*; the value of which coin is not only now lost, but was so entirely forgotten, even in the time of king Edward III. that, whereas the bishop of Norwich was fined a byzantine of gold, to be paid the abbot of St. Edmundsbury, for infringing his liberty (as it had been enacted by parliament in the time of the Conqueror), no man, then living, could tell how much it was; so that it was referred to the king to rate how much he should pay; which is the more unaccountable, because, but a hundred years before, two hundred thousand bezants were exacted by the sultan, for the ransom of St. Lewis, of France; which were then valued at one hundred thousand livres.

Though the coining of money be a special prerogative of the king, yet the ancient Saxon princes communicated it to their subjects; insomuch, that in every good town there was, at least, one mint, but at London eight; at Canterbury four for the king, two for the archbishop, one for the abbot at Winchester, six at Rochester, at Hastings two, &c.

The Norman kings continued the same custom of coining only pence, with the prince's image on one side, and on the other the name of the city where it was coined, with a cross so deeply impressed that it might be easily parted, and broken into two halves, which, so broken, they call *half-pence*, or into four parts, which they called *farthings*, or *farthings*.

In the time of king John, money coined in the east parts of Germany came in special request in England, on account of its purity, and was called *easterling money*, as all the inhabitants of those parts were called *Easterlings*; and, shortly after, some of those people, skilled in coining, were sent for hither, to bring the coin to perfection; which, ever since, has been called *sterling*, from *easterling*.

King Edward I. who first adjusted the measure of an ell by the length of his arm, herein imitating Charles the Great, was the first, also, who established a certain standard for the coin, which is expressed to this effect by Gre-

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gory Rockley, mayor of London, and mint-master. "A pound of money containeth twelve ounces: in a pound there ought to be eleven ounces, two easterlings, and one farthing, the rest alloy: the said pound ought to weigh twenty shillings and three-pence in account and weight; the ounce ought to weigh twenty-pence, and a penny twenty-four grains and a half. Note, that eleven ounces two-pence sterling ought to be of pure silver, called *leaf-silver*; and the minter must add, of other weight, seventeen-pence half-penny farthing, if the silver be so pure."

About the year 1320, the states of Europe first began to coin gold; and, among the rest, our king Edward III.

The first pieces he coined were called *Florences*, as being coined by Florentines; afterwards he coined nobles; then rose nobles, current at six shillings and eight-pence; half-nobles, called *halfpennies*, at three shillings and four-pence, of gold; and quarters at twenty-pence, called *farthings of gold*. The succeeding kings coined rose-nobles, and double rose-nobles, great sovereigns, and half Henry nobles, angels, and shillings.

King James I. coined units, double crowns, Britain crowns; then crowns, half-crowns, &c. On this subject, see *MEDALS*.

TABLES of Gold and Silver, composed from the Authority of Mr. Lowndes, who inspected the original Indentures, and from Bishop Fleetwood.

Gold Table.					Silver Table.				
Reigns.	Specie.	Division.	Tale.	Stand. fine.	Specie.	Tale.	Stand. fine.	Propor.	
		<i>s. d.</i>	<i>£ s. d.</i>	<i>car. gr.</i>			<i>oz. dwt.</i>	100	
28 Edw. I.	—	—	—	—	—	XX III	11 2	13 83	
18 Edw. III.	Florins	VI	15 0 0	23 3½	—	—	—	—	
Eodem ann.	Nobles	VI VIII	13 3 4	Ditto	—	—	—	—	
20 —	Ditto	Ditto	14 0 0	Ditto	—	XXII VI	Ditto	—	
27 —	Ditto	Ditto	15 0 0	Ditto	IV II 1	XXV	Ditto	—	
30, 37, 46 } 18 Ric. II. } 3 Hen. IV. } 9 Hen. V. }	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	—	
1 Hen. VI.	Royals	X	22 10 0	Ditto	IV ½	II ¼	XXX	Ditto	
4 —	Angels	VI VIII	16 13 4	Ditto	—	—	XXXVII VI	Ditto	
24 —	Nobles	VI VIII	16 13 4	Ditto	—	—	XXX	Ditto	
39 —	Ditto	Ditto	Ditto	Ditto	—	—	Ditto	Ditto	
4 Edw. IV.	Angels	VI VIII	22 10 0	Ditto	—	—	XXXVII VI	Ditto	
5 —	Nobles	—	20 16 0	Ditto	—	—	Ditto	11 1	
8, 11 16, } 22 — } 1 Ric. III. } 9 Hen. VII. }	Angels	X	22 10 0	Ditto	—	—	Ditto	—	
1 Hen. VIII.	Sovereigns	XXII VI	27 0 0	Ditto	—	—	Ditto	—	
	Royals	XI III	—	—	—	—	—	—	
	Angels	VI VI	27 0 0	Ditto	—	—	XXXV	Ditto	
	Nobles	VI VIII	—	—	—	—	—	11 17	
	{ Crowns	V	Gold stand.	lowered.	—	—	—	—	
	{ ½ Ditto	II VI	25 2 6	22 0	Ditto	—	Ditto	—	
34 —	Sovereigns	XX	28 16 0	23 0	—	—	Silver stand.	lowered.	
36 —	Angels	VIII	30 0 0	22 0	—	—	—	—	
37 —	Crowns	V	30 0 0	20 0	—	—	—	—	
1 Edw. VI.	Ditto	Ditto	Ditto	Ditto	—	—	—	—	
3 —	Ditto	Ditto	34 0 0	22 0	—	—	—	—	
4 —	Sovereigns	XXIV	28 16 0	23 3½	—	—	—	—	
5 —	Angels	VIII	—	—	—	—	—	—	
6 —	Sovereigns	XXX	36 0 0	23 3	—	—	—	—	
	Angels	X	—	—	—	—	—	—	

A rate of confusion

s. s. d.
v 2 6
d. XII VI III
1½ ¼d.

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Gold Table.					Silver Table.				
Reigus.	Specie.	Division.	Tale.	Stand. fine.	Specie.	Tale.	Stand. fine.	Propor.	
		s. d.	£ s. d.	car. gr.	d.	s. d.	oz. dwt.	100	
1 Mary	Sovereigns	xx	33 0 0	22 0	—	LX	11 0		
2 Eliz.	Crowns	v							
	Sovereigns	xxx	36 0 0	23 3½	VI IV III	Old stand.			
	Royals	xv							
	Angels	x	33 0 0	22 0	—	LX	11 2	11 16	
19 Eliz.	Sovereigns	xx							
26 —	Crowns	v	36 0 0	23 3½	Ditto	LX	11 2		
35 —	Angels	x							
	Nobles	xv	33 0 0	22 0	s. s. d. d.	LXII	11 2		
43 —	Sovereigns	xx							
	Crowns	v	33 10 0	22 0	v 2 6 XII	Ditto	Ditto	11 2	
2 Jac. I.	Unites	xx							
	Dub. crow.	x	37 4 0	22 0	d.	Ditto	Ditto	11 2	
	British crow.	v							
	Thistl. crow.	iv	40 10 0	23 3½	VI II I ½	LXII	11 2		
3 —	Royals	xxx							
10 —	Angels	x	44 0 0	Ditto	s. s. d. d.	LXII	11 2		
	Ditto	Ditto							
	Unites	xxii	40 18 4	22 0	v 2 6 XII	LXII	11 2		
2 Car. I.	Donb. Ca-rolus's, &c.	xi							
	Rose Royals	xxx	44 10 0	23 3½	d.	LXII	11 2		
	Spur Royals	xv							
	Angels	x	40 0 0	22 0	VI II 1 ½	LXII	11 2		
	Unites	xx							
	Dub. crow.	x	The same of both kinds and value, gold and silver.						
12 Car. II.	British crow.	v							
23 —	Guineas	xx	44 10 0	22 0	Ditto	LXII	11 2	14 54	
	½ Guineas	x							
	2 Guineas	xl	Ditto	Ditto	Ditto	Ditto	Ditto		
1 Jac. II.	5 Guineas	c							
1 W. & M.	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto		
Queen Anne	<p>I do not find any alteration in the standard of the gold or silver down to the present time. 22 carats fine and 2 alloy are the lb. of gold, and 11 oz. 2 dwt. fine, and 18 dwt. alloy, the standard lb. of silver; and the division of the pound of gold continues the same; that is to say, into 44½ guineas, and the silver into the usual number of crowns, &c. But the guineas have varied in the nominal value several times, rising up to xxxs. and declining to xxs., the present current value; but never have been reduced again to their intended level of xxs., nor indeed ought, when compared with the Portugal pieces of 3l. 12s., 1l. 16s., the guinea appears to be better worth xxs.</p>								
George I.									
George II.									
								15 21	

		To the lb. Troy.	
Portugal	£ 3 12	- 13	£ 46 16 0
English guineas	1 1	- 44½	46 14 6
			0 1 6
And the Portuguese standard worse ⅓ grain			0 2 6
Total worse lb. troy by standard and tale			0 4 0

wherein the Portugal is much more defective than the English coins, may be very good reasons for their being refused in payments in any of the receipts of the public revenue; but answer very well the purpose of those who benefit by the irregularity, in trading with the heavier, and passing off the lighter by tale; and which, if they can turn into guineas or heavy silver, make another gain.

How our standard is proportioned to that of other countries, and thence what the true par of exchange is between us, see COIN.

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A TABLE exhibiting the Standard, Weight, Value, and comparative View of English Gold Money from King William I., A.D. 1066, to King George III. A.D. 1764.

Years of the kings' and queens' reigns, or the dates of the several mint indentures.	Standard of the gold at each period.	Value or number of pounds, &c. the lb. troy of stand. gold has been coined into.			Value or number of pounds, &c. the oz. troy has been coined into.			Value of 20 shillings of coined gold at each period of our present money.			Proportion of the same 20 shillings to our present 20 shillings.	Proportion between the current value of the lb. troy of standard silver and standard gold.	Proportion of fine silver to fine gold at each period.								
		Fine gold.	Alloy.		£	s.	d.	£	s.	d.				£	s.	d.					
Anni Regnorum. A.D.		oz.	dw.	gr.	oz.	dw.	gr.	£	s.	d.	£	s.	d.	£	s.	d.					
William I. - - -	1066	11	18	18	0	1	6														
William II. - - -	1087	11	18	18	0	1	6	9	0	0	15	0	5	12	8 $\frac{1}{2}$	5.63414	9.0000	8.36874			
18th Edw. { III. } { VI. }	1345	11	18	18	0	1	6	15	0	0	15	5	1 $\frac{5}{8}$	3	7	7 $\frac{1}{2}$	3.38048	14.8148	13.7754		
18th same - - -	1345	11	18	18	0	1	6	13	3	4	1	2	0	5	3	17	0	4	3.85118	13.0041	12.0917
20th same - - -	1347	11	18	18	0	1	6	14	0	0	1	3	5	3	12	5	4	3.62194	12.4444	11.5714	
27, 30, 37, and 46th d ^o	1373																				
18th Richard II. - - -	1395	11	18	18	0	1	6	15	0	0	1	5	1	3	7	7 $\frac{1}{2}$	3.38048	12.0000	11.1581		
and 3d Henry IV. - - -	1402																				
9th Henry V. - - -	1422	11	18	18	0	1	6	16	13	4	1	7	11	3	0	10	3.04243	11.1111	10.3315		
11th and 39th Henry VI. { 1422 } { 1461 }		11	18	18	0	1	6	22	10	0	1	17	8	2	5	0	2.25365	12.0000	11.1581		
4th same - - -	1426	11	18	18	0	1	6	16	13	4	1	7	11	3	0	10	3.04243	11.1111	10.3315		
4th Edw. { IV. } { VII. }	1465	11	18	18	0	1	6	20	16	8	1	14	10	2	8	8 $\frac{1}{2}$	2.43394	11.1111	10.3316		
5, 8, 11, 16, and 22d d ^o	1482																				
11th Richard III. - - -	1483	11	18	18	0	1	6	22	10	0	1	17	8	2	5	0	2.25365	12.0000	11.1581		
and 9th Henry VII. - - -	1494																				
11th and 23d Henry VIII. { 1509 } { 1532 }		11	18	18	0	1	6	27	0	0	2	5	2	1	17	6	1.87804	12.0000	11.1581		
11th and 23d same { 1509 } { 1532 }		11	0	0	1	0	0	35	2	6	2	5	8	1	27	2	1.85971	11.1656	11.2682		
34th same - - -	1543	11	10	0	0	10	0	28	16	0	2	10	1	1	13	11	1.69614	12.0000	10.4348		
36th same - - -	1545	11	0	0	1	0	0	30	0	0	2	14	6	1	11	1	1.55750	12.5000	6.81818		
37th same - - -	1546																				
11th and 2d VI. } Edw. IX. }	1549	10	0	0	2	0	0	30	0	0	3	0	0	1	8	3	1.41591	12.5000	5.0000		
3d same - - -	1550	11	0	0	1	0	0	34	0	0	3	1	9	1	7	5	1.37426	9.4444	5.15151		
4th same - - -	1551	11	18	18	0	1	6	28	16	0	2	8	3	1	15	2	1.76066	8.0000	2.01048		
6th same - - -	1553	11	18	18	0	1	6	36	0	0	3	0	3	1	8	2	1.40853	12.0000	11.1078		
6th same - - -	1553	11	0	0	1	0	0	33	0	0	3	0	0	1	8	3	1.41591	11.0000	11.0500		
11th Mary I. - - -	1553																				
2d Elizabeth - - -	1560	11	18	18	0	1	6	36	0	0	3	0	3	1	8	2	1.40853	12.0000	11.0576		
2d and 35th same { 1560 } { 1594 }		11	0	0	1	0	0	33	0	0	3	0	0	1	8	3	1.41591	11.0000	11.1000		
19th and 26th same { 1578 } { 1585 }		11	18	18	0	1	6	36	0	0	3	0	3	1	8	2	1.40853	12.0000	11.1581		
43d same - - -	1601	11	18	18	0	1	6	36	10	0	3	1	1	7	9	1.38924	11.7741	10.9481			
43d same - - -	1601	11	0	0	1	0	0	33	10	0	3	0	10	1	7	10	1.39477	10.8064	10.9047		
11th James I. - - -	1603	11	0	0	1	0	0	37	10	0	3	8	2	1	4	11	1.24600	12.0967	12.2067		
2d same - - -	1604	11	0	0	1	0	0	37	4	0	3	7	7	1	5	1	1.25604	12.0000	12.1091		
3d same - - -	1605	11	18	18	0	1	6	40	10	0	3	7	10	1	5	0	1.25203	13.0645	12.1479		
10th same - - -	1613	11	18	18	0	1	6	44	0	0	3	13	8	1	3	0	1.15243	14.1935	13.1977		
10th same - - -	1613	11	0	0	1	0	0	40	18	4	3	14	4	1	2	10	1.14195	13.1935	13.3189		
2d Charles I. - - -	1627																				
12th Charles II. - - -	1661	11	18	18	0	1	6	44	10	0	3	14	6	1	2	9	1.13948	14.3548	13.3478		
2d Charles I. - - -	1627	11	0	0	1	0	0	41	0	0	3	14	6	1	2	9	1.13948	13.2258	13.3460		
22d Charles II. - - -	1671																				
11th James II. - - -	1685	11	0	0	1	0	0	44	10	0	4	0	10	1	1	0	1.05000	14.3548	14.4853		
William III. - - -		11	0	0	1	0	0	47	15	9	4	6	11	2	0	19	9.76743	15.4314	15.5717		
3d George I. - - -	1717																				
3d George III. - - -	1763	11	0	0	1	0	0	46	14	6	4	4	11	1	0	0	1.00000	15.07258	15.20960		

MONEY.

A TABLE, shewing the Standard Weight, Value, and comparative View of English Silver Money, from King William I. A. D. 1066, to A. D. 1765.

Years & the Names of the Monarchs.	Quantity of the Silver at each period.		No. of Moulds &c. in the pound weight; &c. in former ounces & penny of standard Silver of each period.	Weight of twenty shillings in reckoning of standard silver at each period.		Weight of fine silver contained in twenty shillings at each period.		Value of the same twenty shillings in reckoning of our present money.			Preparation of money at each period to that of our present money.	Value of the ounce of the then standard silver to that of our present money.		Value of the ounce fine silver at each period.	Kings and queens in these periods.
	Fine Silver.	Alloy.		oz. dw. gr.	oz. dw. gr.	l. s. d.	l. s. d.	s. d.	s. d.						
1066	11 2	0 18	21 4	11 5 0	10 8 3	2 18 1 $\frac{1}{2}$	2 9062	5 2	1 11 $\frac{1}{4}$	William Conq.					
1087	11 2	0 18	20 0	12 0 0	11 2 0	3 2 0	3 1000	5 2	1 9 $\frac{1}{2}$	William Rufus.					
1300	11 2	0 18	20 3	11 17 1	10 19 6	3 1 2 $\frac{1}{2}$	3 0614	5 2	1 9 $\frac{1}{2}$	Edward I.					
1347	11 2	0 18	22 6	10 13 8	9 17 8	2 15 1 $\frac{1}{2}$	2 7557	5 2	2 0 $\frac{1}{2}$	Edward III.					
1354	11 2	0 18	25 0	9 12 0	8 17 11 $\frac{1}{2}$	2 9 7 $\frac{1}{2}$	2 4802	5 2	2 3	Richard II.					
1395											Henry IV.				
1402											Henry VI.				
1412	11 2	0 18	32 0	7 10 0	6 18 18	1 18 9	1 9375	5 2	3 10 $\frac{1}{2}$	Henry VI.					
1422	11 2	0 18	30 0	8 0 0	7 8 0	2 1 4	2 0666	5 2	2 8 $\frac{1}{2}$						
1422	11 2	0 18	37 6	6 8 0	5 18 10	1 13 0 $\frac{3}{4}$	1 6531	5 2	3 4 $\frac{1}{2}$						
1426	11 2	0 18	30 0	8 0 0	7 8 0	2 1 4	2 0666	5 2	2 8 $\frac{1}{2}$	Edward IV.					
1446											Edward V.				
1461											Henry VII.				
1464	11 2	0 18	37 6	6 8 0	5 18 10	1 13 0 $\frac{1}{4}$	1 6531	5 2	3 4 $\frac{1}{2}$	Edward V.					
1482											Henry VII.				
1483											Henry VIII.				
1494	11 2	0 18	40 0	6 0 0	5 11 0	1 11 0	1 5500	5 2	3 7 $\frac{1}{4}$	Henry VIII.					
1505											Henry VIII.				
1509											Henry VIII.				
1532	11 2	0 18	45 0	5 6 16	4 18 6	1 7 6 $\frac{5}{8}$	1 3776	5 2	4 0 $\frac{5}{8}$	Henry VIII.					
1543	10 0	2 0	48 0	5 0 0	4 3 8	1 3 3 $\frac{1}{2}$	1 1635	4 7 $\frac{7}{8}$	4 9 $\frac{5}{8}$						
1545	6 0	6 0	48 0	5 0 0	2 10 0	0 13 11 $\frac{1}{2}$	0 6984	2 9 $\frac{1}{2}$	8 0						
1546	4 0	8 0	48 0	5 0 0	1 13 8	0 9 3 $\frac{3}{4}$	0 4656	1 10 $\frac{1}{8}$	12 0	Edward VI.					
1547											Edward VI.				
1548											Edward VI.				
1549	6 0	6 0	72 0	3 6 16	1 13 8	0 9 3 $\frac{3}{4}$	0 4656	2 9 $\frac{1}{8}$	12 0	Edward VI.					
1551	3 0	9 0	72 0	3 6 16	0 16 16	0 4 7 $\frac{7}{8}$	0 2328	1 4 $\frac{1}{8}$	24 0	Mary I.					
1553	11 1	0 19	60 0	4 0 0	3 13 16	1 0 6 $\frac{1}{2}$	1 0286	5 1 $\frac{1}{4}$	5 5 $\frac{1}{4}$						
1560	11 2	0 18	60 0	4 0 0	3 14 0	1 0 8	1 0333	5 2	5 4 $\frac{1}{2}$						
1583	11 2	0 18	62 0	3 17 10	3 11 14 $\frac{1}{2}$	1 0 0	1 0000	5 2	5 7	Charles I.					
1601											Charles II.				
1605											Charles II.				
1627	11 2	0 18	62 0	3 17 10	3 11 14 $\frac{1}{2}$	1 0 0	1 0000	5 2	5 7	James I.					
1661											Charles I.				
1671											Charles II.				
1685	11 2	0 18	62 0	3 17 10	3 11 14 $\frac{1}{2}$	1 0 0	1 0000	5 2	5 7	James II.					
1720											George I.				
1764											George III.				

For tables containing the principal gold and silver coins of all nations: the first table shewing the fineness of those of gold, compared with the English standard of 22 carats, with their weight, and contents in pure gold, and their value, according to the mint price of gold in England, *i. e.* 3*l.* 17*s.* 10 $\frac{1}{2}$ *d.* per ounce, standard; and the second table ex-

hibiting the fineness of all silver coins, compared with the English standard of 11 oz. 2 dwts., their weight and contents in pure silver, with their value according to the mint price of silver in England, *i. e.* 5*s.* 2*d.* per ounce, standard; we refer to the valuable publication of Dr. Kelly, entitled "Universal Cambist."

The king, by proclamation, may at any time prohibit all his subjects, not exceeding one year, to lend or advance money to any foreign prince or state, without licence under the great or privy seal; and if any person knowingly offend in the premises, he shall forfeit treble the value of the money lent, &c. two-thirds to the king, and the other to the informer; but persons may deal in foreign stocks, or be interested in any bank abroad, established before issuing his majesty's proclamation. Stat. 3 Geo. II. cap. 5.

MONEY, taking the term in its most comprehensive sense, may be defined to mean any commodity that can be employed for the purpose of facilitating the interchange of what men possess for what they desire.

In the science of political economy, discussion is much retarded and perplexed, by the loose and ambiguous meaning of the terms employed, and by the want of introductory and preparatory axioms: the terms used in this science have, in the common concerns and language of life, acquired certain meanings so firmly, that it is difficult to shake them loose and forget them, when we come to employ them in it. The consequence is, that the reader, not aware that words, the meaning of which is familiar to him, are to be taken, in the discussion on which the author has entered, in a new and peculiar sense, is startled and thrown back into doubt and confusion, when, after having followed the train of reasoning for some time, and admitted its justness and force, he finds that he and the author have throughout it been affixing very different meanings to the same terms. The same perplexing consequences result from the want of introductory and preparatory axioms: perhaps every science would be benefited as well as mathematics, though not to such a degree, if the terms to be employed were previously defined, and the positions to be taken for granted were previously laid down. It is certain that thus the way would be cleared at the commencement, and this every person conversant with subjects which require a long and intricate train of reasoning knows to be of the utmost importance towards the attainment of the truth.

These observations are introduced to apologize for, or rather to warrant the time that may be occupied in pursuing the justness and accuracy of the definition given of money, and in pointing out the erroneous and defective character of some other definitions, before entering on the subject itself.

Hume, in his Essay on Money, has defined it to be "the instrument which men have agreed upon to facilitate the exchange of one commodity for another." At first sight it may seem that this definition of Hume, and that which stands at the head of this article, are precisely the same; they, no doubt, are very similar; and if precision and fullness were not absolutely indispensable in all definitions, and if political economy, as has been already remarked, did not more than most other sciences, require this fullness and precision, Mr. Hume's definition must have been adopted as sufficiently accurate. But on examining it we shall find, that, taking it strictly (and a definition, if it will not bear to be taken strictly, loses its essential character and its whole utility), it does not comprehend money, when employed to interchange labour and skill for commodities. In all cases where one commodity is exchanged for another commodity, and an instrument is employed for the purpose of facilitating that exchange, that instrument, according to Mr. Hume's definition, is money; but if we adhere strictly to his definition, the facilitating of no exchange except of one commodity for another is effected by money; or rather, Mr. Hume's definition does not comprehend any other kind of exchange, except that of one commodity for another, and here he does not comprehend all the uses of money, or employs the term

commodity in a sense not generally known and admitted: in either case it is objectionable; in the first, because there are instances of interchange which it does not comprehend, and in the second case, because it employs a term in a meaning not known and acknowledged.

After all, however, Mr. Hume's definition of money approaches much nearer the truth than those which are commonly given. According to some, money may be defined to be the standard of value. Here another source of error and confusion opens to our view: in all scientific discussions, metaphorical language, or terms borrowed from other subjects, if not employed with great caution and judgment, are very prejudicial: they either leave no distinct idea when transformed from their appropriate subjects, or more frequently carry with them more of their original meaning and force than the subject to which they are applied will admit of. If we examine the phrase standard of value, without at present enquiring how far it is a proper definition of money, we shall find that it gives no distinct idea: the word standard is here employed in a meaning perfectly different from that which is given to it, in subjects where it is a common and appropriate term. If we were to talk of the standard of weight, of height, or of fineness, we should be immediately struck with the expression as conveying no meaning, as, in fact, nonsense: it is well known what a standard weight, height, or fineness are; they mean a weight, height, or fineness fixed by law or custom. Standard of value, therefore, as applied to money, cannot define it, because, if examined, it will be found to convey no meaning: and if the terms be altered, and "standard value" used in their stead, though these words convey a meaning, it is a meaning which cannot be applied to them, if employed as a definition of money. Money cannot be said to be the standard value of commodities: if the price of any commodity were fixed by law, suppose, for instance, that the price of a bushel of wheat were fixed at one guinea, then this coin, this description of money might be said to be the standard value of a bushel of wheat; but in no point of view can money, generally speaking, be said to be the standard value of commodities; and we have shewn that the expression standard of value has no meaning.

It perhaps may be thought that more time has been occupied in pointing out the absurdity of this definition than was necessary; but in political economy, as much is to be done by removing error, as by establishing truth: when error is completely removed, so that the way is clear and open, common sense will do much in this branch of science.

The next definition of money is much more plausible: those who are aware, either of the absurdity, or who suspect the incorrectness of the former definition, maintain that money is the measure of value. In our remarks on that definition which made money the standard of value, it was not deemed necessary to investigate the proper meaning of the word *value*, because the remarks that were offered on the other term were deemed amply sufficient to set it aside. But on examining this definition, both the terms must be scrutinized.

Smith, in his Wealth of Nations, has observed that every commodity has two sorts of value, a value in use and a value in exchange; but in political economy the term *value* can have only one meaning. Political economy relates only to a state of society, where a division of labour exists; where, of course, each man has more of the commodities his labour and skill have produced than he has occasion for, and consequently wishes to exchange them for commodities produced by the labour and skill of others. Where no division of labour exists; where there is, consequently, no interchange of com-
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commodities; there is, strictly speaking, no wealth, no value; there is no room, no occasion for the science of political economy. Whether, in treating of other subjects, *value* should or can be used in a sense different from that which is given it in political economy, as a science relating to the interchange of commodities, is a question foreign to the present discussion. In political economy, and under the circumstances of society, which political economy supposes and refers to, *value* ought only to be employed in one sense. What that sense is a little reflection will teach us.

In the state of society we are supposing commodities are interchanged: before this can take place, the quantities or weights of each commodity that are to be given for any other commodity, must be fixed; and that particular weight or quantity of any given commodity, which can be obtained for a certain weight or quantity of another commodity, may, strictly speaking, be said to be the value of this second commodity; it avails or has power to obtain the former commodity. But this expression may be reciprocally used: if, for instance a bushel of wheat is exchanged for 30lb. of meat, the value of the bushel of wheat may be said to be 30lb. of meat, and the value of 30lb. of meat to be a bushel of wheat. Value, therefore, is a term which, in political economy, has, properly speaking, only one meaning, because this science relates solely to a state of society, where interchange of commodities takes place: and this meaning of the word value, referring to the interchange of commodities, implies that where any two commodities are interchanged, each can procure a certain portion of the other.

Let us now revert to the definition of money under consideration: according to it, money is the measure of value. The expression, at first sight, seems sufficiently precise and clear, whatever opinion may be formed of its propriety and justness as a definition of money. But a closer inspection and examination of it will probably convince us that it is not so precise and clear as at first sight in seems to be. When we talk of a yard as a measure of length, we have precise and clear ideas affixed to our expression: we mean, that if such a table is a yard long, we can immediately not only figure to ourselves its length, but compare it with other objects which possess length. How will this apply to money defined and considered as the measure of value? Whoever knows what a yard is, immediately and clearly knows what is meant by a yard of cloth; but he who equally well knows what an ounce of gold, or a guinea is, by no means, therefore, certainly knows what quantity of corn, or any other commodity, this ounce of gold or guinea will measure. Indeed the very application of the term *measure*, as applied to value, when thus brought forward in a particular case, and not used generally and loosely, must strike us as improper, and contrary to analogy. We have seen what is the meaning of the term *value*; it expresses the quantity of any particular commodity which can be procured in exchange for another commodity:—in order to do as much justice as possible to the definition of money, under consideration, let us take money as one of the commodities, and corn as another; we shall still perceive that the definition is incorrect. How can money be said to measure the value of corn? It has been observed, that value is a reciprocal expression; that is, it can be equally well applied to either of the two commodities, which are interchanged for each other: if money, therefore, may be defined to be the measure of the value of any commodity, of corn for instance; corn, with equal propriety, may be defined to be the measure of the value of money. But in neither case can the definition be used; for nothing changeable in value, that is, which at one

time will command a greater or less quantity of any commodity than at another time, can measure value.

It may, perhaps, be urged, that if the term were changed, and if money were defined to be the expression of the value of commodities, the objection would be removed: there is some weight and propriety in this remark: value must have reference to two commodities: it must express how much of any particular commodity can be obtained for another commodity; and as money is used as that commodity, for which all others are directly given in exchange, the value of all others would naturally be expressed with reference to money. But still this would be a very incomplete definition of money; and when we come to enquire how money (according to the definition given at the head of this article) facilitates the interchange of what men possess for what they desire, we shall find that this definition includes the former.

Let us now inquire what qualities money must possess, in order that it may answer the purpose pointed out in the definition; *viz.* that of facilitating the interchange of what men possess for what they desire. Money, it has been said, being the measure of value, must have value, on the same principle and for the same reason, that whatever measures length must have length. It may be true that money must have value; but not for the reason (if reason it can be called) here alleged. This mode of reasoning affords another instance of the bad effects of borrowing illustrations and proofs in political economy from other subjects. At first sight, the conclusion that money, being the measure of value, must have value, appears to follow necessarily from the facts brought forward in support of it; though those facts are merely analogous, and not belonging to the subject to be proved; but it requires only a little time for reflection, it merely requires that the judgment should have time to withdraw itself from the influence of powerful but irrelevant associations, in order to perceive that there is no force in the remark, that because what measures length possesses length, therefore what measures value (allowing the expression) should possess value.

There is, in fact, not the least occasion for bringing in this analogy to prove that money, in its character of money, must possess value: that is implied in the very meaning of the term; nothing can facilitate the interchange of commodities; nothing can be exchanged itself for any other commodity which does not possess value. But a much more important and difficult question remains to be noticed, discussed, and solved. Is it essential to the character and uses of money that the commodity of which it is formed should possess value, independent of its application as such? Another question arises out of this, or rather is involved in it. Can the value of any commodity, when used as money, be greater than it possessed when not applied to this purpose?

In order that these intricate and important questions may be considered with due deliberation, on sufficient data, and in regular order, it will be proper to call in the aid both of speculative reasoning, and of what we know to be fact. Our acquaintance with the history of nations, at that period when they first began to perceive the necessity of adopting some instrument of barter, is so very imperfect, that we are not supplied with a detail of the different methods they pursued previous to the adoption of the metals for that purpose: it is easy to imagine, however, how they would proceed: and by the help of what we actually know to have been the case, and of what we may fairly conclude to have been the intermediate steps, where history is silent, we may gain the point we have in view; *viz.* an answer to the questions, whether it is essential to the character and uses of money,

that the commodity of which it is formed should possess value, independent of its application as such; and whether the value of any commodity, when used as money, is greater than it possessed when not applied to this purpose. All history coincides in informing us that the commodities first used as money possessed value prior to, and independently of, their being invested with this character. Cattle appear to have been used for this purpose at as early a period of history as we can trace back; and when the metals were first employed, those kinds were chosen which were in regular use and demand, and which, consequently, possessed value. Indeed it is natural to suppose, that if a person could not, in exchange for the produce of his labour, procure directly what he wanted, he would dispose of it only for such a commodity as he knew was in general demand, and which, therefore, he could be at no loss to dispose of. Unless we can imagine that men would barter their commodities for what they neither needed at the moment, nor what, at some future period, would procure them what they needed, this must have been the case. Let us suppose that a person, in this state of society, had more corn than his own wants required; and that another person stood in need of this corn, but had only some commodity to offer in exchange for it, which the first person did not then require: if this commodity were of such a nature, as the first person were likely soon to require, or if it were such as he knew was in demand, and would, therefore, be the certain means of obtaining him any other commodity which he might wish for, he would have no objection to exchange his corn for it. But it is evident, that in both these cases the exchange is that of commodities that are valuable; *i. e.* each of which avails to purchase or procure some other useful and desirable commodity. In the latter case, where the exchange of the corn was made for a commodity which was to be employed again in exchange, that commodity, in fact, was money: it answers exactly to the definition of money, it facilitates the exchange of commodities: the person who possessed the corn, wished, for instance, to exchange it for meat; but the person who was disposed to take his corn, and to whom, at that period, we could suppose he could alone dispose of it, had no meat; he, therefore, offered him some other commodity, and if this commodity would avail, either by direct or indirect exchange, to procure meat, the person possessing the corn would not hesitate to part with the one for the other. But it is plain, that unless this commodity would avail to obtain, either directly or indirectly, the meat which he needed (or whatever else it might be), the person could not part with his corn. Money, therefore, or that commodity which is employed for the purpose of facilitating the exchange of what men possess for what they desire, must possess value, at least when first used in that character.

It still, however, remains to be inquired, whether a commodity used as money, and, as such, possessed of value, when first employed for that purpose, may not retain its character and power of money, when deprived of its property of value. As the metals are now used for money, let us suppose that gold and silver were to lose all value, independently of their character as money; that there was no demand for them as articles of luxury or use:—would they still be as valuable as money? It would, at first sight, appear certain, that as they had derived their power as money solely from their being valuable commodities, when they were stripped of their value, they would at the same time be necessarily stripped of their character of money. But this may be doubted, both from what we know of the human mind, and from what actually takes place. Men, having been

so long accustomed to receive gold and silver in exchange for their commodities; and having so long ceased to revert to, or consider on every occasion of parting with their commodities for these metals, that they were receiving something in exchange intrinsically valuable; *i. e.* valuable independently of its character of money; would, by the mere force of habit and association, and by the confidence which they had produced, continue to receive gold and silver, even after their intrinsic value had ceased; *i. e.* after they had lost that property which at first had made them pass as money. This we see partly to be the case: men do not hesitate to receive coin that is much worn; or, in other words, they exchange their commodities for coin, after it has lost part of its value; and the habit and association are much more likely to be broken, by a diminution in the size, or an alteration in the appearance of the coin, while the value of what is actually received remains the same, than by receiving coin in exactly the same state as usual, only that the metal of which it is made has lost its intrinsic value.

We may therefore infer, on this part of the subject, that no commodity can be employed at first as money, unless it possess value; that any circumstance which affects this value, will, for a very considerable time, affect the character and credit of the commodity as money; but that, in process of time, the consideration of the intrinsic value of the commodity loses much of its force, and it is taken as money without reference to this intrinsic value.

In one respect, however, the value of money would fall, if the commodity of which it were formed lost its intrinsic value; *i. e.* if it no longer were in demand for any other purpose but that of money. Let us suppose that the demand for gold and silver, except for the purpose of money, suddenly ceased: the natural and immediate consequence would be, that what was before used for articles of luxury, &c. would be coined into money; and the quantity of money being thus increased, its value would necessarily fall. The other question that was started, *viz.* can the value of any commodity, when used as money, be greater than it possessed, when not applied to this purpose; has, in a great measure, been solved in the observations already made. In all cases where worn coin is taken, this is, in fact, the case. It may, indeed, be urged, that worn coin, only of the inferior metals, is received at its original value; that gold coin is not so received; and that in the instances where silver coin, when worn, is received at its original value, it is only so received as part of the gold coin. But as there can be no doubt of the fact, that the value of twenty-one worn shillings, when compared with the value of a guinea, is much less than the value of that quantity of silver which would form twenty-one mint shillings, when compared with a guinea, the inference is indubitable, that in all cases where worn silver coin is received either for commodities, or for gold coin at its original value, the value of silver used as money is greater than its value as a simple commodity.

The inference which has been drawn, however, from this circumstance is by no means correct;—that money does not derive its character from the intrinsic value of the commodity of which it is formed, nor from the general confidence resulting from the knowledge of that value, and the consequent willing, and habitual acceptance of it in exchange for all commodities; but from authority. Those who are of this opinion, contend that the stamp on the coin gains it a ready circulation, not because it proves its legal weight and purity, but because it is the sign of the authority of government; that in receiving money no regard is paid to the material of

which it is formed, nor to the value of that material, but solely to the authority which issued it. If this were true, the same authority could make stamped leather pass as current as stamped gold and silver. But this opinion is grounded entirely on a misconception of the nature of money, and of the manner in which any given commodity is invested with that character; it also confounds two things quite distinct and unconnected. There can be no doubt that government, or any body of men, who receive a large portion of the wealth of the community, could give a partial circulation to any kind of money, independently of its intrinsic value, by declaring their readiness to receive it in payment of their demands. In Scotland, and in the provincial districts of England, where local bank notes are common, confidence and circulation are often given to them in a great degree, by the declaration of the agents of government, that they will receive them in payment of the different taxes; but this is not authority: this mode of giving circulation to any kind of money is merely an illustration of the doctrine that has been laid down in this article; that the reason why any commodity, when originally employed as money, should possess intrinsic value, is, that thus it will be readily and generally received; but if this ready and general acceptance can be given any other way, the purpose is effectually answered. In a rude state of society, the only mode of ensuring this was, to offer some commodity in general use and demand; and therefore when a person parted with the produce of his labour, if he could not get for it what he wanted, he selected, and kept by him, some commodity which would always ensure the obtaining of the object of his wishes either directly or indirectly. In a more advanced state of society, confidence would effect the same object; but there is a great difference between authority and confidence; there is a great difference between commanding that any commodity should be received as money, and declaring that it will be received as such. The former mode, we know from history, has always failed of success, whenever the command was not supported by the intrinsic value of the commodity ordered to pass as money. The latter mode, if the declaration came from those through whose hands a great portion of the money of the country must pass, will give credit and circulation as money to any commodity, nearly with as much facility and certainty; though not to such an extent, as if the commodity possessed intrinsic value equal to that at which it was issued as money.

Money, then, or any commodity which can be employed for the purpose of facilitating the interchange of what men possess, for what they desire, must, in the first instance, have possessed intrinsic value: if this intrinsic value were lessened, before its character and use, as money, had become so firmly fixed, as to have superseded or effaced, in commercial transactions, all reference to its intrinsic value, then the value of it, as money, would fall in proportion as its intrinsic value were lessened. But this would not be the case, at least so certainly, and in such exact proportion, if the lessening of the intrinsic value took place in a country of great commerce and confidence, in a gradual manner, and by no means that were calculated to create alarm or distrust.

The next topic, in point of order and importance, connected with the consideration of the principles of money, is suggested, and will be best explained by a passage in the essay "Of Money" by Hume, already referred to. "It was a shrewd observation of Anacharsis the Scythian, who had never seen money in his own country, that gold and silver seemed to him of no use to the Greeks, but to assist them in enumeration and arithmetic." In this sentiment of Anacharsis, we may perceive the germ of the opinions of those

authors, who maintain either what they call the doctrine of an abstract currency, or that money is but counters wherewith to reckon the different commodities that are mutually exchanged in the concerns of life; and it is also worthy of remark, that the mode in which the use of money is supplied in London and all commercial cities, where observation and experience have suggested expedients for it, is exactly that which Anacharsis supposes to have been the only mode, in which gold and silver were of use to the Greeks. Our modern merchants, in many of their transactions, merely set off the value of one commodity against the value of another; this they indeed do by rating the value in their books by pounds, shillings, and pence, but real money is not used in the transaction. But to return to the consideration of the more immediate and relevant topic suggested by the remark of Anacharsis. If gold and silver were of no use, but to assist in numeration and arithmetic, as he directly maintained; and as those who regard it only as counters, virtually maintain; or if the real currency of a country could be only an abstract currency; then the value of this money or currency could not vary, except by a variation in the supply of commodities; for, confining ourselves at present to the doctrine which represents money only as counters, it is evident that they must always bear the same proportion to the commodities (provided, as before remarked, that the supply of commodities did not vary) which they served to rate or estimate, in the same manner as if all exchanges of commodities were effected by the mode adopted in London for many of them, the only circumstance which could make any difference in the value at which they were respectively rated in the books of the merchants, would be a variation in the supply; for if money were only counters, and of no use but to assist in numeration and arithmetic, there would be no motive to increase the quantity of it, and consequently any variation between the supply of it and of commodities, must arise from a greater or less supply of the latter. The inference, that any difference in the value of money, or the command it possesses over commodities, must arise from a variation in the supply of the latter, follows more directly and necessarily from the doctrine of an abstract currency. It is, however, so very difficult to conceive of such a currency, and therefore to reason upon it, that very few observations may suffice. Those who maintain it seem to confound two things; the name and denomination, and the power of the currency; and to infer, because the former may be considered as something abstract, therefore the latter is so also; that because the former remains the same, therefore there is no change in the latter. If, however, by abstract currency, they mean money of account, (and that seems the only clear meaning that can be affixed to the terms,) then the observation just made holds perfectly good; that if there were no other money but money of account, or abstract currency, any variation in the power or value of this, when compared with commodities, must proceed from a change in the supply of the commodities; for it is impossible that mere abstract currency, or money of account, not having actual existence, can vary.

But money is of some other use than merely to assist in numeration and arithmetic; and this leads us to the consideration of it, not merely in the character of a commodity which can facilitate the interchange of what men possess for what they desire—though that is the essential character of it; but as the source of industry, skill, and enterprize, and consequently of real wealth. Mr. Hume, remarking on the observation of Anacharsis, says, "It is indeed evident that money is nothing but the representation of labour and commodities, and serves only as a method of rating and estimating

them. Where coin is in greater plenty, as a greater quantity of it is required to represent the same quantity of goods; it can have no effect either good or bad, taking a nation within itself, any more than it would make an alteration in a merchant's books; if, instead of the Arabian method of notation, which requires few characters, he should make use of the Roman, which requires a great many. Nay the greater quantity of money, like the Roman characters, is rather inconvenient, and requires greater trouble both to keep and transport it; it is not however perfectly correct to say, that, taking a nation within itself, a greater plenty of coin can have no effect, either good or bad; and indeed Mr. Hume afterwards points out some effects both good and bad, which a greater supply of coin produces. One effect, however, he does not advert to, which is of so injurious a nature, that if it were not generally, and in a great degree counterbalanced by the beneficial consequences of this greater supply, it would render it a most serious evil. If, where coin is in greater plenty, a greater quantity of it is required to represent the same quantity of goods; then the power of all those who possess only money, over those goods, must be diminished. We must therefore look to the other consequences of a greater supply of money.

These Mr. Hume has detailed, but the order and manner in which he supposes them to flow, is by no means correct, or warranted by facts. As this is a most important and interesting topic, it will be necessary to quote his observations, before we proceed to point out their error.

"Though the high price of commodities be a necessary consequence of the increase of gold and silver, yet it follows not immediately upon that increase, but some time is required before the money circulates through the whole state, and makes its effect be felt on all ranks of people. At first no alteration is perceived; by degrees the price rises, first of one commodity, then of another, till the whole at last reaches a just proportion with the new quantity of specie which is in the kingdom. In my opinion it is only in this interval or intermediate situation between the acquisition of money and rise of prices, that the increasing quantity of gold and silver is favourable to industry. When any quantity of money is imported into a nation, it is not at first dispersed into many hands, but is confined to the coffers of a few persons, who immediately seek to employ it to advantage. Here are a set of manufacturers or merchants, we shall suppose, who have received returns of gold or silver for goods which they sent to Cadiz. They are thereby enabled to employ more workmen than formerly, who never dream of demanding higher wages, but are glad of employment from such good paymasters. If workmen become scarce, the manufacturer gives higher wages, but at first requires an increase of labour; and this is willingly submitted to by the artisan, who can now eat and drink better, to compensate his additional toil and fatigue. He carries his money to market, where he finds every thing at the same price as formerly, but returns with greater quantity and of better kinds, for the use of his family. The farmer and gardener, finding that all their commodities are taken off, apply themselves with alacrity to the raising more, and at the same time can afford to take better and more clothes from their tradesmen, whose price is the same as formerly, and their industry only whetted by so much new gain. It is easy to trace the money in its progress through the whole commonwealth, where we shall find that it must first quicken the diligence of every individual, before it increases the price of labour."

Now there are three positions maintained in this illustrative reasoning, the first of which may, or may not, be true, according to circumstances; the other two cannot be true

under any circumstance. It is assumed that the price of labour will not be increased, in the first instance, by an increase in the quantity of money, because a greater number of workmen will be employed; and of course the number of workmen thus increased, bearing the same proportion to the increased money, that they formerly did, no addition will be made to the price of labour; this, however, cannot be the case, unless we suppose that before the increased quantity of money gave employment to these workmen, they were entirely unemployed; for if they were previously employed, the greater demand for them, occasioned by the increase of money, must undoubtedly and necessarily raise the price of labour. Again, Mr. Hume supposes that the workmen who have thus gained employment, find every thing in the market at the same price as formerly, though an increased demand for the commodities sold there is necessarily occasioned by the increased money these workmen carry to market. If the price of commodities in the market is not increased immediately on the increase of demand for them, when, or how, can it be raised? not afterwards, for, as Mr. Hume justly observes, the farmer and gardener apply themselves with alacrity to raising an additional supply; and if the price was not raised, when there was only the usual supply, and a more than usual demand, it must fail when the supply is raised proportionally to the demand. The same remarks may be applied to the third position laid down by Mr. Hume, *viz.* that the farmer and gardener, though they go to their tradesmen with more money in their pockets, and can therefore afford to buy better, and more clothes than formerly, yet get them at the old prices.

In fact, the process by which an increase of money in any country promotes industry and raises prices, varies according to circumstances: if the increased supply is brought in by those who lay out money principally or entirely in consumption, the process goes on in one mode; if the increased supply is brought in by those who lay out money principally for the purposes of production, the process goes on in another way. In the first instance, the persons into whose possession the increase of money has come, naturally lay it out according to their fancies and habits, either in obtaining a larger quantity of those commodities which they formerly bought, or in the purchase of other commodities which their inferior means hitherto prevented them from obtaining: in either case there is a greater demand in the market while the supply is the same. If, for instance, the increased money comes into the possession of labouring men, they either lay it out in getting more bread for themselves and families; or if they previously had enough of that, but could not procure meat, the increased money is laid out in the purchase of meat. In the one case there is a greater demand for bread, in the other for meat; while the supply is the same: a rise in price must therefore take place. The next step in the process is that the bakers or butchers, finding a greater demand for their articles, and obtaining consequently a higher price for them, are induced to increase the supply: here then we may suppose the increased money and the bread or meat to have balanced each other. But we must look a little farther; the baker or the butcher, in the first instance, obtaining a higher price for their commodities, and subsequently selling a greater quantity, and thus increasing their profits, are enabled, in their turn, to do what the labouring men did when they obtained more money. They can afford to spend more; (for at present, all the cases we suppose are those of men who lay out their increased money in consumption, not in production); the articles on which they spend their increased profits must in their turn experience a rise of price, which will produce a greater supply. It is needless to pur-

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the operations of this additional supply of money any further, or to point out how it will be gradually spread over the community, always in some degree affecting the prices of those commodities to the purchase of which it is applied. It may, however, be further remarked, that there are many disturbing forces, which may prevent the consequences now enumerated from following certainly, and in the order laid down, from an increased supply of money; and that the rise of price is seldom or never proportioned exactly to the increased demand; while, on the other hand, a supply equal to the increased demand seldom brings the prices down to their former level.

Let us now suppose that the increased quantity of money is in the possession of those who will expend it in productions; so no individual case will render the subject more clear, and enable us to trace the consequences more directly and minutely. A cotton manufacturer, for instance, has his capital doubled, and determines to apply this increase of fortune solely to the extension of his trade: of course he must employ more men to work for him, and more of the raw material. Unless we can imagine that there were quite unemployed the additional number of men that he would need, his demand for more workmen must raise the price of labour; and even on the supposition that there were a sufficient number of unemployed workmen, still, if we reflect a little, we must be convinced that the price of labour will be raised, even in this case; for these unemployed workmen, being of course anxious to procure employment, may be considered as a supply greater than the demand in the market; of course this circumstance must have a considerable effect in lowering the price of labour; but when the cotton manufacturer hires them, he in fact increases the demand for workmen, and therefore must raise the price. So that the effect is not altered in its nature, though it is in degree, whether we suppose the cotton manufacturer to go into the market for workmen, where all are already engaged, or where there are a sufficient number to be found unemployed: in the former case, the price of labour would rise much higher than it would in the latter case; for we are to reflect that the lowering of the price of labour or of any commodity is effected, not only by those who want it not being so numerous, or not being so able and willing to purchase it at the former price, but also, in nearly an equal degree, by those who have it to dispose of, on their perceiving the demand diminished, offering it at a lower rate, each being anxious, under these circumstances, to get rid of the article he has in the market.

The first effect, then, of the increased capital of the cotton manufacturer is to raise the price of labour: it is unnecessary to point out again how the increased wages which the labourer obtains will operate on the price of commodities, and subsequently on their supply; this has already been done. But besides a rise in the price of labour, the increased capital of the manufacturer, being partly expended on cotton, and partly also on the buildings and machinery necessary to manufacture this additional quantity of cotton, its effects on these must also be apparent, at first in the rise of price, and afterwards in the greater supply. On the other hand, the supply of cotton goods in the market being increased, while the demand remains the same, the price of them must fall: here then we may perceive an essential difference between the effects of an increased supply of money, accordingly as it comes into the hands of those who lay it out in consumption, or into the hands of those who lay it out in production. In the latter case, the immediate effect is a rise in price, the indirect and subsequent is a greater supply, stimulated by this rise in price; but this greater supply

may not be more than sufficient to meet the greater demand; in the former case, although a rise in the price of labour, and of those articles necessary for the manufacture is occasioned, which is also met by a greater supply; yet, besides these effects corresponding to the effects in the latter instance, there is a greater supply of cotton goods in the market; so that whatever opinion may be formed respecting the consequences (as they affect the national prosperity) of an increased supply of money in the hands of those who expend it in consumption, there seems to be no reason for doubting that the consequences are beneficial, when the increased supply is expended on production.

But it will be proper to look more closely into the effects of a greater quantity of money, in order to perceive in what case it is beneficial to a nation, and by what means it is beneficial; and in what cases it is prejudicial to a nation, and by what means it is so.

When the effect of a greater supply of money is to stimulate industry, so as to bring a greater quantity of commodities into the market, then there can be no doubt that it is beneficial to a nation. At first sight it may appear of little moment, whether there is a greater quantity of commodities produced or not, if the price of them is not diminished: but the real wealth and prosperity of a nation does not consist in there being few commodities produced, though they are sold at ever so cheap a rate; it consists in the abundant supply, provided there is a demand for that supply, whatever be the price of them; for an abundant supply and a proportional demand proves that all classes of the community have full employment; that they are exerting their skill and industry, and that this skill and industry are well paid. Now there is no motive which will stimulate men so powerfully and generally to the exertion of additional skill and industry, as the prospect of greater gain; and the prospect of greater gain cannot be held out, unless there is a greater demand for their goods, and a consequent higher price given for them; this, it is evident, cannot be the case, unless the quantity of money in the nation be increased. It may, indeed, be alleged, that a greater demand for any particular commodity may be created by the abstraction of demand for some other commodity; but in this case it is evident, that what is gained to the nation in one case, is lost in the other; for those who produce the latter commodity will suffer from the diminution of demand, as much as those who produce the former commodity will be benefited by an increase of demand. The case supposed, therefore, must be that of a greater demand for any particular description of commodities, without any variation in the demand for any other commodity; and this case cannot exist, unless there be a greater quantity of money in the nation.

This illustration of the effects of an increased quantity of money has proceeded on the supposition that they were confined within the nation where the increase took place: but it may be proper to examine what will be the effects on the commercial transactions of this nation with other nations: these effects will be similar to those which are known to proceed from great capital; *i. e.* the ability to purchase the raw materials of manufacture cheaper, by taking them in greater quantities, and for ready money, and to sell the manufactured article cheaper, both from the circumstance of the raw materials having been bought cheaper, and from the increase of capital, and consequently of trade, enabling the manufacturer to be satisfied with less proportional profits. It is evident, however, that all these beneficial consequences depend on one important circumstance; that the increased quantity of money, on whatever it is expended, though it at first raises the price, yet soon afterwards, by stimulating indus-

MONEY.

dustry, brings in such an additional supply, as fully answers the increased demand. In this case alone money, when it flows with greater abundance than formerly into a nation, is beneficial to it.

A greater abundance of money will be prejudicial to a nation, either when it flows in too rapidly or irregularly; or when the nation, previously to this additional supply of money, had exerted its industry and skill to the utmost. As this latter case is a very improbable one, we shall confine our observations principally to the former.

When a greater quantity of money flows in very rapidly, the industry of the nation cannot keep pace with it; prices are suddenly raised very high; and though the same effect follows in some degree, even in this case, which we have seen to be the natural consequence of a greater quantity of money, a greater demand, and a rise in the price of commodities, *viz.* that a greater supply is produced by the stimulus given to industry; yet, industry must have some time in which to exert itself, and it also has its limits. Besides, it by no means follows, that the increased demand for any commodity, is in the exact proportion of the increased quantity of money brought into market for the purchase of that commodity; so that if the increased supply of it be regulated by the increased quantity of money, independently of any regard to what is the actual amount of the increased demand, the consequence will be that a larger quantity of the commodity will be brought into the market, than can find vent there, at least at a fair price. Now this circumstance is most likely to happen, where a greater abundance of money flows in very rapidly; the immediate consequence is that there is a strong competition, and the price of the commodity is forced up much higher than would have been the case, if the flow of money into the market had been gradual and progressive.

The same evil results from the circumstance of a greater abundance of money flowing in irregularly; partly in the mode just detailed, and partly in another manner. Nothing renders the production of any commodity so certain and steady, and consequently nothing benefits a nation so large, and those whose labour gives birth to it, so much as a regular and known demand for it: but if at one time there is a large supply of money in the market, and at another time the supply is comparatively small, the manufacturer does not know how to regulate his labour, and as it is safer and more prudent to err on the side of a deficient supply, the market is most likely to suffer in this respect.

We may therefore conclude that where a greater abundance of money flows into a nation slowly, gradually, and regularly, the nation will be benefited by it: industry and skill will proceed in their natural course, by advances likewise slow, gradual, and regular; and the ground which they thus secure, they will keep certainly and firmly. The wealth of the nation resting on a firm foundation, will not be apt to be shaken or diminished. But, on the other hand, where the influx of wealth is sudden, rapid, or irregular, it will certainly tend much more to raise the prices than to increase the supply of commodities; and even that increased supply, as far as it does take place, will not be constant or regular.

The other case, in which a greater abundance of money was stated to be prejudicial to a nation, was that, where, previously to this additional supply, the nation had exerted its industry and skill to the utmost. This, it was added, was a very improbable case; yet it certainly existed in Holland some time before the French revolution destroyed the commerce of that country. Money was there so abundant, that it could scarcely be employed in any manner, so as to produce

a small profit. In this country, therefore, under these circumstances, it is evident that a greater abundance must have been prejudicial; the only effect it could have would have been that of still farther depressing the profits of those who either had money to lend, or who employed it themselves.

Let us now look at the effects on the property of a nation, which would be produced by diminishing the quantity of its money; and, in order that we may perceive and trace these effects more clearly, let us suppose a particular case. Let us suppose that the quantity of money brought into the market for the purchase of meat was diminished: the immediate result would be, that each butcher, anxious to dispose of his meat, would offer it below the usual price; or, if we can suppose that they all persisted in seeking, and actually obtained the usual price, then, in this case, part of the meat must remain unsold. In either case, the butchers would carry home less money than usual, and of course would be able to spend less on the commodities they were in the habit of buying; the vendors of those commodities, in their turn, would either be obliged to dispose of them all at reduced prices, or there would remain unsold a part of them. This would happen if the money withdrawn were what was usually laid out in articles of consumption; but if it were what were usually laid out on labour, and for the manufacture of commodities, it is plain that the price of labour would fall, and the supply of manufactured articles would be diminished. In process of time, no doubt all things would accommodate themselves to this diminished supply of money; but in the mean while industry would be checked, and the real strength and prosperity of the nation would be affected.

It is a curious and difficult question to solve, whether, under any circumstances of the diminution of money, the supply of commodities would still remain the same, so that, in fact, the only consequence would be that all things would be cheaper; in the same manner, that the only consequence of an increased supply of money may, under certain circumstances be, that the price of commodities is raised; or whether, as on the latter supposition, the consequence may be, either that the price is raised, or that industry being stimulated, the supply of commodities is increased in a proportion equal to the increase of money; so, on the former supposition, of a diminution of money, the consequences may be either a diminution of price, or a proportional diminution of supply. One thing, however, is certain, that as it is scarcely possible for money to flow into a nation in greater abundance than formerly, without stimulating the industry of the nation, whatever may be its permanent effects on the price of commodities; so it is scarcely possible for money to be taken away from a nation, without checking its industry, whatever may be the effects of this measure on price.

Dr. Smith justly observes, that it is impossible to determine what is the proportion which the circulating money of any country bears to the whole value of the annual produce circulated by means of it; but though it is impossible to determine this, yet one rule for approximating towards the truth is laid down, which, as it seems to proceed on an erroneous idea of the nature of money, deserves some notice in a discussion on the principles of that commodity. It has been said, that the quantity of money required to conduct the commerce of any nation, must be directly as the amount of that commerce, and as the rapidity with which the money circulates; it is this latter division of the rule for estimating the necessary quantity of money, that requires some notice, as proceeding on an erroneous idea of it. Whenever any commodity employed as money ceases to circulate, it ceases to be money; it is only money, strictly and properly speaking, while it circulates; and in the intervals of its circulation,

ulation, be they long or short, it suffers a temporary loss of that character, because it is not then performing the office of money. A thousand guineas locked up in the chest of a miser, or by any other means kept unemployed, can with no more propriety be called money than a thousand ounces of plate, or a thousand medals of gold in the same situation. The phrase rapidity of circulation, therefore, ought to be set aside, as conveying an erroneous idea. To put this in a stronger and clearer point of view; let us suppose that the circulating medium of any country consists of a million guineas; and that there are coined at the mint an additional hundred thousand: while these continue in the mint, it could not with any propriety be said, that the circulating medium was increased one-tenth; nor could this be said, if, as soon as they were issued from the mint, they were locked up, and not brought into circulation. Let us now suppose, that the circulating medium consists of 1,100,000*l.*, but that one-eleventh of this, or 100,000*l.*, are constantly unemployed: they, strictly speaking, could not be said to constitute any part of the money of the nation; nor, if they were thrown into regular and constant circulation, could it be said that the rapidity of the circulation was increased, any more than it could be said with propriety that the circulation was increased by the additional supply of one hundred thousand guineas from the mint, or from the chest in which they had been locked up. It makes no real difference in the circulating medium of a country, whether the same hundred thousand guineas are constantly locked up, or when a sum to that amount, the guineas constituting it continually changing, is constantly unemployed: the circulating medium in both cases would be actually increased, if that sum were added to the money of the country; *i. e.* if it were brought into constant use; in neither case could it properly be said that the rapidity of circulation was increased.

An erroneous idea, founded on a similar misconception of the real nature of money, is very generally entertained respecting the cause of a high or low rate of interest. That the rate of interest should be low when money is plentiful in a country; and that, on the other hand, it should be high when money is scarce, are supposed to be the natural, obvious, and necessary consequences of these circumstances respectively. Now, as in the case of coin unemployed, it has not the character, and cannot fulfil the offices of money; so in the case of money not brought into competition with any given commodity, it cannot affect the price of that commodity. There is as little reason to suppose that an increased quantity of money would directly and necessarily raise the price of meat, if it were all expended in the purchase of bread, as to imagine that this increased supply, merely because it flows into a nation, should lower the rate of interest: the rate of interest, like the price of all commodities, must depend on the proportion between the supply and demand: if the increased quantity of money is employed to enlarge the supply of money to be lent out at interest, while the demand continues the same, then the rate of interest will be lowered; but if it is employed for any other purpose, then it can have no effect on the rate of interest. Such are the leading and most important topics connected with the discussion of the *principles* of money, to which alone this article has been confined. An attempt has been made to illustrate these principles, in the first place, by pointing out the real nature of money, or the qualities necessary in any commodity which is to be employed for the purpose of facilitating the interchange of what men possess for what they desire; in the second place, by pointing out the modes in which money operates in the interchange of commodities; and in the third place, by detailing and explaining the effects produced

on the prosperity of a nation, by an increase or diminution in the supply of money. Some collateral and incidental topics have also been touched upon, all tending to the same object, *viz.* that of illustrating the nature of money, and the mode of its operations.

It has been thought proper to abstain from introducing any discussion respecting the different kinds of money that have been, or are, generally employed, or respecting the questions to which this branch of the subject would naturally give rise; as whether, if metallic money is employed, one metal alone should be the standard and legal tender, and the others should be permitted to circulate along with it, according to their market price; or whether the proportions should be fixed by law: the discussion of this point will fall under the head of *SILVER*. What are the advantages and disadvantages of a metallic and paper currency; and the various important questions connected with this branch of the subject of money; these will fall under the head *PAPER Currency*: and what circumstances affect the proportional value of the currency of one country, as compared with that of other countries; these will be considered under the head *PAR of Exchange*. In the course of the present article, the nature of value has been slightly touched upon; this will be more fully and particularly treated of under its proper head; and some further illustration of the nature and operations of money, will occur under the articles *PRICE, STOCK or Capital, and WEALTH*, which could not so properly find a place in this article.

In noticing the authors that treat on the *principles* of money, it is scarcely necessary to mention Smith, in his *Wealth of Nations*; on this, as on most of the fundamental topics of political economy, this author is perspicuous and satisfactory, though he does not always exhaust the subject on which he treats.

On the *principles* of money, much perhaps may be gained from his incidental illustrations, and from the general principle that pervades his works, and lies at the foundation of his system, than from what he directly advances on the subject. Hume, in his essay "Of Money," has thrown out only some very luminous ideas, which, though not always exactly correct, as we have endeavoured to prove, yet almost unavoidably, in the mind of an attentive reader, give rise, not merely to the perception of the error which they contain, but also to such a train of reflections as still further illustrate the subject. Indeed it is the singular merit of this author in his essays, that he guides and stimulates his readers to reflection. Sir James Stewart, in his *Enquiry into the Principles of Political Economy*, has entered pretty fully into the subject of money in the 28th chapter of his 2d book: there is a very striking and essential difference between the works of this author and that of Smith in his *Wealth of Nations*. Throughout the whole work of Stewart, there is that want of methodical and luminous arrangement, that obscurity and unsatisfactoriness in reasoning, and that clashing and contradictoriness of opinion, which must exist, where there are no clear and well grounded general principles established and pursued. His chapter on money, however, contains many valuable and sound doctrines; pushed in some instances too far, as where he endeavours to prove that an increase of money in a nation cannot affect the prices; the opinion that it necessarily, uniformly, and permanently must raise the prices, is no doubt erroneous; but if the illustrations in this article are correct, the contrary opinion, that it cannot produce this effect, is also erroneous. The controversy which took place towards the close of the 17th century respecting the state of the currency, and that which took place a few years ago, gave rise to many pamphlets, some of which treat directly and entirely

on the principles of money, and others of them only incidentally; these are, of course, of various merit, and will not add much that is satisfactory and solid to what may be gathered from Smith, Hume, and Stewart.

MONEY, *Falsæ*, or *Basæ*, is either struck by an unqualified person, and of unfatutable metals; or that which has lost of its weight, either by being clipped on the corners, or filed on the edges: or, lastly, by having some of its surface eaten off; if gold, by aqua regia: if silver, by aqua fortis.

Another kind of base money is that made of pieces of iron, copper, or other metal, covered on each side with a thin plate or leaf of gold or silver, neatly soldered and joined round the edges, and struck, like other coin, with figures, legends, &c. only to be distinguished from them by the bulk and weight, and sound.

MONEY-BILLS, in *Parliamentary Language*, comprehend all bills, by which money is directed to be raised upon the subject, for any purpose or in any shape whatsoever; either for the exigencies of government, and collected from the kingdom in general, as the land-tax: or for private benefit, and collected in any particular district, as by turnpikes, parish-rates, and the like. With respect to these bills, the commons are so reasonably jealous of their privilege of framing new taxes for the subject, that they will not suffer the other house to exert any other power but that of rejecting: they will not permit the least alteration or amendment to be made by the lords to the mode of taxing the people by bills of this nature.

MONEY, *Cert.* See **CERT-MONEY**.

MONEY, *Chimney*, *Madning*, *Poll*, *Press*, *Prestation*, *Salvage*, *Ship*, and *Trophy*. See the several articles.

MONEY-WORT, in *Botany*. See **NUMMULARIA**.

MONEYERS, **MONEYORS**, or *Moniers*, officers of the mint, who work and coin gold and silver money; and answer all the warte and charges.

MONEYERS is sometimes also used for hawkers; or those who make a trade of turning and returning money.

MONEYGALL, in *Geography*, a small post-town of Ireland, in the King's county. It is 69 miles S.W. from Dublin, and 10 S.W. from Roserea.

MONEYMORE, a small post-town of the county of Londonderry, province of Ulster, Ireland, in the southern part of the county. It is 83 miles N. from Dublin, and two miles from Cookitown.

MONFALCO, a town of Spain, in Catalonia; 5 miles N.E. of Cervera.

MONFALCONE, a town of Italy, capital of a small principality of the same name, seated on the coast of the Adriatic, and containing about 1200 inhabitants; the whole territory comprehends 20 villages, and about 4600 inhabitants; 15 miles N.W. of Trieste. N. lat. 45° 53'. E. long. 13° 30'.

MONFALOUT, or **MONFLOT**. See **MANFALOUT**.

MONFIA, an island in the Indian sea, near the coast of Africa, governed by a king, tributary to the Portuguese; about 60 miles in circumference. S. lat. 7° 30'.

MONFORT-L'AMAURY, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Versailles. The place contains 2400, and the canton 15,809 inhabitants, on a territory of 212½ kilometres, in 28 communes.

MONFORTE, or **MONTFORT**, a town of Portugal, in the province of Tras-los-Montes; 33 miles W. of Bragança.—Also, a town of Spain, in Valencia; 13 miles W.N.W. of Alicante.—Also, a town of Portugal, in the province of Alentejo; 12 miles S. of Portalegre. N. lat. 38° 56'. W. long. 7° 12'.—Also, a town of Portugal, in Beira; 15

miles S.E. of Castell Branco. N. lat. 39° 38'. W. long. 6° 58'.—Also, a town of Sicily, in the valley of Demona; 10 miles W.S.W. of Messina.

MONFORTE de Lamos, a town of Spain, in Galicia; 15 miles N.N.E. of Orense.

MONGAELLI, a sea-port of Madagascar, on the W coast. S. lat. 13° 55'.

MONGAGUBA, a river of Brazil, which runs into the Atlantic, S. lat. 9° 20'. W. long. 34° 56'.

MONGALLO, or **GALLO**, a kingdom of Africa, N. of Mocaranga; having a capital of the same name, on a river called Mongallo, which runs into the Indian ocean, S. lat. 10° 5'. E. long. 39° 14'.

MONGALORE, a town of Hindoostan, in the Carnatic; 15 miles W. of Gingee.

MONGAN, a town of Chinese Tartary. N. lat. 41° 46'. E. long. 123° 54'.

MONGANORE, a town of Hindoostan, in Golconda; 12 miles W.N.W. of Rachore.

MONGAS, a country of Africa, S. of Sofala, furnishing a great quantity of gold, particularly at Massapa and Maninas, and the mountain of Ophir, whence, as some have supposed, Solomon derived his treasures. The Portuguese are settled at Massapa, under the government of Mozambique.

MONGASABA, a town of Hindoostan, in Oude; 28 miles N. of Kairabad.

MONGAULT, **NICHOLAS-HUBERT DE**, in *Biography*, a man of letters, who was born at Paris in 1674, entered, at an early age, into the congregation of the Fathers of the Oratory, and was sent to study philosophy at Mans. The system then taught in the schools was that of Aristotle, which, as Mongault could not comprehend, he did not scruple to reject, and adopted that of Descartes in its stead, the principles of which he openly maintained in public exhibitions. His want of health obliged him to retire, in 1699, to the college of Burgundy, at Paris, where he finished a translation of Herodian, which was published in the following year. In a few months afterwards, he published the first volume of a translation of the "Letters of Cicero to Atticus," and almost immediately after, Colbert, archbishop of Toulouse, gave him apartments in his palace. In a short time the superintendent Foucault, who wished for the conversation and services of a man of learning, prevailed upon Mongault to reside with him, and obtained for him admission into the Academy of Inscriptions and Belles Lettres. In 1710, the duke of Orleans appointed him tutor to his son, the duke of Chartres: in this situation he is celebrated by Duclou, in his Memoirs of the Regency, as "a man of parts and erudition; a theologian, who thought freely on the subjects of religion;" but whether he thought his pupil incapable of enlightened principles, or that princes should themselves be subjected to the most powerful restraints, he certainly endeavoured to impress on the mind of the young prince a system of religion which had a tendency to excite the greatest degree of terror. The result was, as might have been expected, that after his father's death, the youth went into all the austerities of monkish devotion, in which he continued till his death. The abbé's services were, however, so well received by the family, that he obtained, through their means, several church benefices and civil places. For many years of his life he was subject to melancholy, but when free from this complaint, his conversation was lively and instructive. He died in 1746: besides his translation of Cicero's letters, in six volumes, he published two dissertations in the Memoirs of the Academy of Inscriptions. He was admitted into the French academy in 1718. Moreri.

MONGELIA, in *Geography*, a small island in the Persian gulf, near Cape Barilitan. N. lat. 27° 37'.

MONGER, a little sea vessel which fishermen use.

When a word ends with *monger*, it signifies *merchant*; from the Saxon *manger*, *v. v. mercator*.

MONGERAH, in *Geography*, a town of Hindoostan, in Oude; 55 miles N.W. of Manickpour.

MONGHIR, a town and fortress of Hindoostan, in Bahar, on the S. coast of the Ganges; 40 miles E. of Bahar. N. lat. 25° 25'. E. long. 86° 36'.

MONG-HOA, a city of China, of the first rank, in the province of Yun-nan, to which no district belongs; it is surrounded with high mountains, which abound with the animals that yield musk. N. lat. 25° 18'. E. long. 100° 4'.

MONGIA, or MUGIA, a sea-port town of Spain, in Galicia, near the sea-coast; 35 miles W.N.W. of Compostella.

MONGIARDIA, a town of the Ligurian republic; 23 miles N. of Genoa.

MONGLEE, a town of Hindoostan, in Dowlatabad; 28 miles S. of Renapour.

MONGLEGOARRY, a town of Hindoostan, in the circle of Guntoor; 12 miles E. of Guntoor.

MONGLETORE, a town of Hindoostan, in Goiconda; 30 miles S.W. of Rachore.

MONGOL, one of the small Philippine islands, N.E. of Mabate. N. lat. 12° 14'. E. long. 123° 55'.

MONGOLBONG, one of the smaller Philippine islands, E. of Mabate. N. lat. 12° 10'. E. long. 124°.

MONGOLES, MONGULS, or *Moguls*, a people of ancient origin, and of widely extended dominions in the north-western parts of Asia; whose conquests, as far as history can trace them, might be confined to oblivion, if they had not produced in successive ages signal revolutions in the state of governments and of mankind. It is not easy to separate them from the people called Tartars, or to ascertain their first rise, and their early progress towards that vast empire which they ultimately acquired. Both the Moguls and Tartars are said to have been the descendants of Japhet, the eldest son of Noah. The progeny of Magog, Melchec, and Tubal, as many learned men have maintained, planted both the Scythians, and consequently the country of the ancient Moguls and Tartars. The Tartars claim priority of origin, and pretend to be descended from Turk, the eldest son of Japhet, whom they call Japhis. From their ancient ancestor they derive the name of Turks, which they seem to have retained till the time of Jenghiz Khan. This name was succeeded by that of Tartars or Tatars; and this appellation was afterwards changed by some of their tribes into that of Monguls or Moguls, which appellation prevailed till the dominion of the people, thus denominated, over the southern provinces of Asia expired, when the former name was again resumed. The immediate successor of Turk was his son Taanak, who contributed to enrich and aggrandize the nation over which he presided; and the government descended in this line, from which Timur Beg at a future period is said to have sprung. One of these princes, called Alanza Khan, having twin sons, *viz.* Tatar and Mogul, or more properly Mung'l, divided his dominions between them, not long before his decease. From Tatar Khan, the Tatars or Tartars derived their name, as the Moguls deduce theirs from Mogul or Mung'l Khan. The latter prince, the first monarch of the Moguls, was of a very melancholy disposition, which circumstance gave occasion to his name; *Mung*, in the Tartarian language, signifying *melancholy*. At his death he left four sons, from the eldest of whom, in a direct

line, descended the famous Jenghiz Khan. Kara Khan, the eldest of these sons, ascended the throne upon the decease of his father; and the Tartars say, that in his time the true religion was banished out of the world, and idolatry substituted in its place. His son and successor, Ogus Khan, is said to have worshipped the true God; and issued an order, that every one in his dominions should embrace the true religion. Ogus Khan was a valiant and victorious prince, and subdued by his arms the people of Kitay or Kathay, and those of other nations. Ogus Khan, who extended his conquests through a long reign, as the Tartars say, of 116 years, was held in high veneration over a great part of the East, and regarded as the greatest hero, except Jenghiz Khan, that ever lived in the eastern parts of the world, by the Turks and Tartars of all denominations. The Ottomans, or Ottoman Turks, so called in contradistinction to the Turkish or Tartarian tribes settled in Great and Little Tartary, from him assume the name of Oguzians; and pretend that the Othman or Ottoman family is descended in a direct line from Ogus Khan. The Tartar historians blend many fictions with their account of the Tartarian and Mogul princes, so that at this distance of time, and without the assistance of collateral records, it is impossible to distinguish between the true and the fabulous relations which their history contains. Although they are mistaken in their chronology, as is the case particularly with Abu'l Ghazi Bahadur, whose Tartarian MS. containing the genealogical history of the Turks, Tartars, and Moguls, was brought into Europe by M. Von Strahlenberg, by him translated into the German tongue, and afterwards into French, and published at Leyden in 1726, who refer Ogus Khan to the ninth generation from Noah; it nevertheless appears, that this prince was at the head of a powerful nation in the East, from which the present Tartars sprung, and rendered himself famous by his conquests. Some have supposed, that this Ogus Khan was the same with the Madyes of Herodotus, and, therefore, that the conquests of this prince terminated in the reduction of the Upper Asia, and that he put an end to his expeditions about the year 631 B.C.

Dismissing the ancient history of the Mongoles or Moguls, between whom and the Tartars many contentions subsisted for several successive ages, we shall confine our account of them, in the sequel of this article, to a later period. In the 9th century these nations appeared roaming about the northern side of China and Corea; in the west, or Modern Mongolia, the Mong-u, afterwards called Monk-kos and Mongoles; further to the east, the Kitanes; and lastly, beyond Corea, as far as the eastern ocean, the Niudsches or Kin, who, generally speaking, are the same people with the Tunguses, and the Mandschu or Manchew, the present sovereigns of China. These three people, gradually increasing, became at length powerful nations; though at first they were weak and inconsiderable. In the 10th century, the Kitanes first subdued the two other nations, and then the northern provinces of China. The Niudsches, however, soon rebelled, and being called to their assistance by the Chinese, gained the ascendancy over them, as well as the Kitanes. Upon this, a part of the latter retreated westwards, and took possession of the Lesser Bucbaria, where they have since borne the name of Karakitans, or Karakitayans. In the mean time the Niudsches ruled over the north of China, and the Mongoley as far as the eastern ocean. The Mongoles were divided into several hordes, who, notwithstanding the supremacy of the Niudsches, had their own khans. It was one of these petty princes, Temudschin or Temulin, who, under the name of Tschinghis-khan, or Jenghiz-khan, became the founder of a new monarchy, and

and one of the most memorable ravagers of the world. He was only thirteen years old, on the death of his father in 1176, when he became sovereign of 40,000 families. His career lasted twenty years; during which time he desolated the countries and subjected the people from the Mongolee and from China to the further Asia, and in Europe quite up to the shores of the Dnieper. In the first three years of his warfare, he subdued the Naimans, Kirghises, and the other Tartarian hordes. He received the voluntary submission of the Igures, a polished nation, who communicated the art of writing to the Mongoles, from whom afterwards the Mandchu received it. About the same time he pressed forward into the north-western parts of China, and made the king of Tangut his vassal. Soon after he turned his arms against the Niudsches, proceeding in his conquests, murder, and rapine, as far as the capital of Irking, forced it to surrender, and found in it the wise Ilidschutzay, a truly great and noble-minded man, whom he made his first officer of state; and who not only rescued several millions of persons from their impending fate, who would otherwise have fallen victims to the savage Mongoles, but who may be also justly said to have created the Mongolian state, by polishing the manners of that people, and, as far as he was able, disseminating among them the arts and sciences. While the Mongolian army was fighting against the Niudsches, in 1217, the flames of war broke out with increasing fury on the western side of the Mongolian empire, which, in process of time, communicated to all the countries round, and the Mongoles advanced to nether Asia, and thence again to Europe. Having defeated Keschluk, king of the Naimanes, and caused the country to submit, Tschinghis hastened to meet the sultan of Khovarefm, who had caused his ambassador to be slain, and who was his mightiest and most dangerous adversary, and obliged him to submit. In 1220, Khovarefm, the capital, was captured, and on this occasion the number of the killed amounted to upwards of 100,000 persons, and every Mongolian warrior received to his own share twenty-four slaves. About the same time all the countries and nations round, as far as the Oxus, submitted to his arms. Tschinghis now dispatched an army across that river, took Khorasan, and drove the new khovarefmian sultan to India. Another army was engaged in China against the Niudsches; a third was making conquests in Kaptschak, on the N. side of the Caspian; and a fourth, which had reduced the countries on the S. side of that sea, was now advancing against the Kaptschaks. In 1223, the Polovtzes, a branch of the Kaptschaks, and Russians lost the great battle on the Kalka, and were pursued as far as the Dnieper by the Mongoles; who, without proceeding farther into Russia, returned, laden with their booty, by Kaptschak to Bucharia, to join Tschinghis. In this year Tschinghis convoked a general diet, in which was settled the form of government to be adopted by the conquering countries. His intended progress to India was resisted by the army; and, therefore, after an absence of seven years he returned, in 1225, to Mongolee; but in the following year he was obliged to undertake a campaign against the rebellious Tangut. The Mongoles penetrated across the great sandy desert into that country, and were every where victorious; the royal race was exterminated, and the inhabitants were slaughtered in such shocking multitudes, that scarcely one in fifty was spared. After this conquest, and when Tschinghis was meditating the destruction of the empire of the Niudsches in China, death, in 1227, terminated all his projects. Oktay, the son and successor of Tschinghis, put an end to the empire of the Niudsches in China, and reduced the whole northern China to his authority; he then

made war upon the kings of Corea, and determined, with an army of more than a million and a half of men, to overrun the world from one end of one hemisphere to the other. With 600,000 of his troops he marched in person against the dynasty of Song in southern China; while the main body of his army, under the command of his son Kayuk and his nephews Baaty and Menku, proceeded to the west. In their progress they subdued the Tcherkasses and Avkhases, penetrated the Baschkirey, into Kazan and Bulgaria, and finally came to Moscow. Fourteen Russian towns were burnt in one month, February 1238. Baaty proceeded toward Novgorod, and ordered all the inhabitants in his passage to be massacred: but suddenly changing the direction of his march, he hastened to the regions of the Polovtzes and Bulgarians on the Volga. After a desperate resistance of ten weeks, Kief surrendered (1240), and received a Mongolian viceroy. All Russia, except Novgorod, was now tributary to the Mongoles, who every where appointed viceroys, without expelling the Russian princes. Baaty khan, with two great armies, ravaged Poland, Silesia, and Moravia; marched in person into Hungary, pillaged and murdered wherever he went, both here and in Slavonia, Bosnia, Servia, and Bulgaria. While the Mongoles were committing such horrors in Europe, and prosecuting the war against the Coreans and the southern Chinese, they overran likewise, with their numerous hosts, the hither Asia. A force was sent through Tscherkassia, or Circassia, to make an incursion upon Armenia; and the Mongoles penetrated into the regions of Arbela, marched through Nineveh, approached Bagdad, conquered Erzerum, ravaged and subjugated several cities and districts of the Lesser Asia, and in 1242 made the sultan of Iconium their vassal. In the following year they pursued their inroads into Syria, and came to Aleppo. The death of Oktay saved Asia for a time, and Europe for ever. After an interregnum of four years, the succeeding grand khan Kayuk made formidable preparations for war in Europe, but death defeated his projects. His successor Menku abolished the caliphate, and subjected the sultan of Iconium and Asia Minor, as far as the straits of Constantinople, to the Mongolian authority. Menku was succeeded in 1259 by Koblay. The distance of the paramount sovereign from the other Mongolian states, which extended from the eastern ocean as far as the Dnieper and the Mediterranean sea, accelerated by discord and ambition the dissolution of this enormous monarchy, which now separated into the following extensive states, viz. China, Iran or Persia, as far as the hither Asia, Dschagatay or Tchagatay, so called after its founder, Kaptschak, and Turan; which see respectively. The next ambitious conqueror, or cruel destroyer, as we may call him, that occurs to our notice in the history of the Mongoles, is Timur or Tamerlane, who was prince of Kesch, near Samarcand, about the time when the Mongoles were entirely expelled from China. His dominion took its rise in Grand Bucharia, a part of the ancient Dichagatay. Having succeeded in the reduction of that empire, he received, in 1369, the homage of the grandees, and the title of the sovereign of the world. Of his expeditions and conquests we have given some account under the article *MOGUL Empire*, and referring to his biographical article, we shall here only say that just as he was preparing to restore the dominion of the Mongoles in China, he was removed by death. His successors lost, one after another, all the countries which Tamerlane had left them, Bukharay and Khorasan excepted; and even these the last khan Baber, in 1498, was obliged to abandon, who, however, from being an outcast and a fugitive, became the founder of the state of Grand Mongolia,

Mongolia in Hindoostan. With the fall of the Great Mongolian empire of the Tschinghis began also the epocha of their decline: the dissolution into smaller states, which parted again into smaller still, and were then reduced to subjection, at length brought about a division into stems and hordes, and, consequently, a complete retrogradation from the state of civilization to the condition of raw uncultivated man. It appears that many centuries ago the Mongoles were divided into two leading nations, whose partition might probably be owing either to national circumstances, or to a natural separation by mountains, and afterwards kept up by the separate interests of their princes, or from a national enmity occasioned by perpetual dissensions. These two nations were brought to a union into one common state by the great Tschinghis; but on the destruction of the monarchy which he had erected, they were separated again by the ancient feuds, and have ever since, to their mutual ruin, been engaged in almost perpetual hostilities. The Mongoles, properly so called, compose the one, and the Doerben-Oirat the other of these nations. Doerben-Oirat means the quadruple alliance, and is the common appellation of four principal races, viz. the Oeloet, Kho-it, Tummüt, and Barga-Burat. The Oeloet constitute that branch, which in Western Asia and in Europe is known under the name of *Kalmucks*, which see: the second shoot, Kho-it, is almost extinct, if we except some remains among the Soongares and Mongoles: of the Tummüt, even the place of their present abode is not certainly known; and the fourth stem, Barga-Burat, which probably, at the time of the troubles excited by Tschinghis, took up its residence in the mountains about the Baikal, has, with all its branches, ever since the conquest of Siberia, been under the Russian sovereignty. The Mongoles comprehend the remainder of that people who were driven out of China in the 14th century by the dynasty of Ming, and are at present for the most part under the Mandshur sovereigns of that empire; though a small portion of them own the Russian sceptre. Since the demolition of the Soongarian authority, and the restoration of peace in the Mongoley, they have inhabited the spacious region between Siberia and proper China, from the eastern ocean to the Soongarey; and at present there is scarcely any discernible difference between the yellow Mongoles, living from remote ages under the Chinese protection, and the former Tschinghis or Kalkas-Mongoles. See *KALKAS*.

When Siberia was conquered by the Russians at the beginning of the 17th century, the Mongoles were still a numerous and free people, governed by their own khans, under whose sovereignty were also several Siberian nations. At first they submitted to the Russian arms; soon afterwards they regained their liberty, and even granted support to several nations of Siberia in their resistance to that power. In their intestine wars with the Kalmucks, they were generally conquerors, with the loss, however, of one race after the other. Their frequent and bloody wars with China were still more unfortunate in their issue, as their perpetual feuds finally terminated in a complete subjugation. At present they are not in a condition to liberate themselves from the yoke; though they have preserved their paternal seat, and ostensibly live under the government of their own hereditary princes. The Mongoles, who now form a part of the inhabitants of the Russian empire, withdrew themselves in the 17th century from the Chinese dominions, and put themselves under the Russian supremacy; but this secession was restrained by a border treaty entered into in the 18th century between Russia and China, the former stipulating not to give admittance any more to Mongolian runaways. The Russian Mon-

gols inhabit the regions about the Selenga in the Irkutsk district of the government of Irkutsk, their dwelling place extending from the 121 to the 125th degree of longitude, and between the 50th and 53d degree of north latitude. They consist of seven stems, and these of 20 families or "amaks," which, by the enumeration of the year 1766, comprised, besides 219 baptized, 6918 males.

The vast country of the Mongoles or Moguls is bounded on the N. by Siberia, on the E. by Eastern Chinese Tartary, on the S. by the great wall and Leaotong, and on the W. by Independent Tartary. It was partly from these dry deserts that those conquerors issued, who made all Asia tremble. The Mogulation is subdivided into a multitude of others, who all speak the same language, called the Mogul language, comprehending several dialects understood by one another. These have neither towns, villages, nor houses; they form themselves into wandering herds, and live under plain tents, which they transport from one place to another, according to the temperature of the different seasons, or the wants of their flocks; they pass the summer on the banks of rivers, and the winter at the foot of some mountain, or little hill, which shelters them from the sharp north wind. Each of these tribes has its respective limits, nor can they go beyond them without being thought to commit an act of hostility. They are naturally clownish, and dirty in their dress, as well as in their tents, where they live amidst the dung of their flocks, which, when dried, they burn as fuel. Enemies to labour, they satisfy themselves with the food supplied by their flocks rather than take the trouble of cultivating the earth; they neglect agriculture more from pride, alleging that "the grass was for beasts, and beasts for man." The men hunt the numerous beasts, and game, that roam through their vast wilds; the women tan leather, dig the culinary roots, prepare the winter provisions dried or salted, and distil the koumiss, or spirit of mares' milk. In summer they live only on milk, using, without distinction, that of the cow, mare, ewe, goat, and camel. Their ordinary drink is an infusion of coarse tea in warm water; with which they mix cream, milk, or butter, according to their circumstances. Before they distil their four milk, those of better condition mix with it some of the flesh of their sheep, which, as well as the milk, has been left to ferment. This liquor is strong and nourishing; and their most voluptuous orgies consist in getting drunk with it. Mead and brandy are now great favourites with them. The Moguls are rather short in stature, with flat visage, small oblique eyes, thick lips, and a short chin, with a scanty beard. Their ears are large and prominent, the hair black, and the complexion of a reddish or yellowish-brown; but that of the women is clear, and of a healthy white and red. They have surprising quickness of sight, and apprehension. In their disposition they are free, open, and sincere; they are docile, hospitable, beneficent, active, and voluptuous. Industry is a virtue, entirely female; and though great, it is accompanied with perpetual cheerfulness. They pride themselves chiefly on their dexterity in handling the bow and arrow, mounting on horseback, and hunting wild beasts. Polygamy is allowed, though they commonly content themselves with one wife; marriages are celebrated at an early age, and the bride brings a dower in cattle or sheep. Their tents are circular, in form of the frustum of a cone, and covered with a large piece of white or grey felt. A round hole in the top gives passage to the smoke, which rises from a fire made in the middle of the tent. These tents, which they have been accustomed to prefer to the Chinese houses, are cold in winter, and insupportably warm, and noxiously damp, in summer.

The tents of the nobles are hung with silk, and the floor covered with Persian carpets. The household utensils are numerous; and in the superior tents are vessels of pewter, silver, and porcelain. Their dress consists of a flat yellow bonnet, which covers the head that is shaven, except one lock, wide trowsers, a vest of light stuff with narrow sleeves, and a girdle, which supports the sabre, knife, and implements for smoking tobacco. The outer vestment is of cloth, or skin, with wide sleeves, and linen is wound about the feet, over which are drawn buskins of leather, generally black or yellow. Shirts are unknown. The dress of the women is the same, but instead of the outer garment they wear a gown without sleeves. The skins, which they use for clothing, are generally those of sheep; the wool side being inmost, and the skin on the outside. They are well acquainted with the method of preparing and whitening these skins. But these skins, however carefully prepared, exhale a strong and disagreeable smell, on which account they are called by the Chinese "Tfao-tatse," stinking Tartars. The hair of the females is long, and plaited in tresses.

When pasturage begins to fail, all the tribes strike their tents, generally from ten to fifteen times in the year, proceeding in the summer to the northern, and in the winter to the southern wilds. The herds, men, women, and children, form a regular procession; and are followed by the girls, singing with harmony and spirit. The amusements of these jovial wanderers consist in running-races on horseback, in which even the girls excel; archery, wrestling, pantomime, dances, and the songs of the young women, generally accompanied by the lute, viol, and pipe; the themes of their ditties being tales of gigantic chivalry, and amorous adventures and sentiments; but the melody is harsh and dismal. Cards are not unknown, but the favourite game is chess. The bodies of the princes and chief men are burned with many solemnities; and the tombs are sometimes walled, and ornamented with high poles and fantastic drapery. They are unacquainted with the use of money, and trade only by barter. Such, also, with some shades of difference, are the manners of the Tartars and Mandchurs. In the Mogul language there are many books written in the various countries to which their wide conquests extended.

The religion of the Mogul Tartars is confined to the worship of Fo. For their "Lamas" they entertain the most superstitious veneration; though these are clownish, ignorant, and licentious priests, yet to them they attribute the power of calling down hail or rain; and to them they give the most valuable of their effects in return for prayers, which they go about reciting from tent to tent. These people are very devout, and continually wear hanging at their necks a kind of chaplet, over which they say their prayers.

All the Moguls are governed by khans, or particular princes independent one of the other, but all subject to the emperor of China, whom they consider as the grand khan of the Tartars. When the Manchews subdued China, they conferred on the most powerful of the Mogul princes the titles of "vang," "peilé," "peizé," and "cong," which correspond to our titles of king, duke, count, and marquiss; each of them had a revenue assigned him, but far inferior to the appointments of the Manchew lords at Peking. The emperor settled the limits of their respective territories, and appointed the laws, according to which they are at present governed. These tributary khans have not the power of condemning their subjects to death, nor of depriving them of their possessions: the two cases of death and confiscation being reserved for the supreme tribunal

established at Pe-king for the affairs of the Moguls, to which every individual may appeal from the sentence of his prince, who is obliged to appear in person whenever he is cited.

All the Mogul nations, under the Chinese government, of which we have given an account in the closing paragraph of this article, are divided into four principal tribes, which are the Moguls, properly so called, the Kalkas, Ortous, and Tartars of Kokonor. The country of the Moguls, according to the map of Chinese Tartary, taken from the Memoirs of the Jesuits, extends more than 300 leagues from E. to W., and 200 from N. to S.; it is inclosed between the country of the Ortous, the great wall, Eastern Tartary, and the country of the Kalkas; these people compose 49 "ki," or standards; every standard comprehending an indeterminate number of companies, each of which consists of 150 heads of families; and each company may be reckoned to contain 1000 individuals. Besides these 49 standards, there are five others, under the immediate government of the emperor of China, and commanded by officers whom he sends thither.

The best cultivated canton of all the Mogul territories is the district of "Cartching," near the great wall, where the emperor every year hunts, and where he has caused to be built several pleasure-houses, the principal of which is "Geho." The extensive domains in this district, belonging to the emperor, are let out to farmers, and the number of cattle kept by them is immense. It has been said that they reckoned there 190,000 sheep, distributed into 225 flocks, and almost as many oxen and cows, divided into herds, each of which contained 100. The number of stallions there is more considerable. These riches in farms, studs and flocks make greater impression on the minds of the Tartar and Mogul princes, and render them much more sensible of the majesty of the emperor, than all the magnificence of his court at Pe-king. Anc. Un. Hist. vol. xviii. Tooke's Russia, vol. i. Grofier's China, vol. i. See *MOGUL Empire*, and *TARTARY*.

MONGON, a town of Peru, situated on its coast, in the fourth Pacific ocean; 10 leagues N. of the harbour of Guarmey, and four leagues from Bermajo island: it is known at sea by a high mountain just over it, which is seen at a greater distance than any others on this part of the coast.

MONGON, *Cape*, lies on the S. side of the island of St. Domingo.

MONGOOSE, or MONGOOZ, in *Zoology*, is a species of *lemur* in the Linnæan system, the woolly maucauco of Pennant, and by some called the Macassar fox. See *LEMUR Mongoz*.

MONGOPUNGOLE, in *Geography*, a town of Hindoostan, in the circar of Meywar; 36 miles E. of Cheitore.

MONGOU KIAMEN, a post of Chinese Tartary. N. lat. 44° 46'. E. long. 125° 28'.

MONGUILLEM, a town of France, in the department of the Gers; nine miles N.W. of Nogaro. N. lat. 43° 52'. W. long. 0° 7'.

MONGUIPATANE, a town of Hindoostan, in the circar of Aurungabad; 24 miles S. of Aurungabad.

MONGULCOTE, a town of Hindoostan, in Bengal; 18 miles N. of Burdwan.

MONGULHAUT, a town of Hindoostan, in Bengal; 16 miles N. of Rungpour.

MONGUMMA, a town of Hindoostan, in Beggiland; 15 miles N.E. of Rewah.

MONHEGAN, or MENHEGAN, a small island in the Atlantic

Atlantic ocean; 12 miles S.E. of Pemaquid Point, in the county of Lincoln and state of Maine.

MONHEIM, a town of the duchy of Berg, on the Rhine; nine miles S.S.E. of Dusseldorf.—Also, a town of Bavaria, in the principality of Neuburg; 18 miles W.N.W. of Neuburg. N. lat. 48° 47'. E. long. 10° 46'.

MONI, a small island in the gulf of Bengia.

MONIAGUR, a town of Hindoostan, in Concan; 48 miles N. of Bancout.

MONIAN, a town of Bengal; 20 miles S. of Calcutta.

MONIEH, one of the smaller Hebrides. N. lat. 57° 28'. W. long. 7° 36'.

MONJES, a cluster of small islands in the Spanish main, near the coast of South America. N. lat. 12°. W. long. 70° 40'.

MONIGLIA, GIO. ANDREA, of Florence, in *Biography*, member of the academy della Crusca; a physician by profession, was author of a great number of poems for music. He may be regarded, says M. Laborde, as one of the first who began to reform the abuses of the age; but this was only in his dramatic works, they were all printed at Florence, and dedicated to the grand duke, in 1698. He was established in the service of his court, which, by very expensive efforts, seems to have delighted in the exhibition of whatever the wild imagination of poets could invent. His works were brought on the different stages of Italy from 1657 to about 1680.

MONIKEDAM, or MONIKENDAM, in *Geography*, a sea-port town of Holland, on the river Monick, on the borders of the Zuyder see, with a small port; nine miles N.E. of Amsterdam. N. lat. 52° 29'. E. long. 4° 52'.

MONILIA, in *Botany*, from *monile*, a necklace, alluding to the beaded appearance of the threads, which are supposed to be the seat of the fructification. Perf. Syn. Fung. 691. Obf. Mycol. fasc. 2. t. 4. f. 8, 9. (*Aspergillus*; Mich. Gen. 212. t. 91.)—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Stalked or dispersed, fibrous. Threads beaded or jointed.

Perfoon defines 12 species of this minute, but curious genus. They are confounded by common observers, under the general idea of *Mucor*, or Mould, being found on various putrifying vegetable substances; sometimes on the dung of animals. The author just mentioned disposes them in three sections, of which we shall cite an example or two.

Section 1. *Stalked; the threads collected into a round head.*

M. glauca. Perf. n. 4. (*Aspergillus capitatus*, capitulo glauco, seminibus rotundis; Mich. Gen. 212. t. 91. f. 1. *Mucor glaucus*; Linn. Sp. Pl. 1656. Fl. Dan. t. 777. f. 2.)—Tufted, of a glaucous grey.—Common on rotten apples, peaches, melons, &c. It forms tender greyish-white patches, of no determinate figure. When examined with a microscope, each minute individual proves to be a globose *head of threads*, radiating in every direction, and supported by a long slender *stalk*. The texture is so tender and evanescent, that the plant cannot be preserved.

M. penicillatus. Perf. n. 7. Obf. Mycol. fasc. 2. 35. t. 4. f. 8, 9.—Clustered, lemon-coloured, permanent. Stalk downy. Threads even.—Found by Perfoon on the dung of mice, but very rarely. The texture is durable. *Stalks* rigid, shorter than the former, their height scarcely exceeding the diameter of the *head*. The *threads* are smooth, not beaded, forming an exception to the generic character, so that Perfoon justly doubts, whether this little plant be properly referred to *Monilia*. It can hardly however be reduced to any other known genus.

Section 2. *Caulifert; threads straight, digitate.*

M. digitata Perf. n. 9. (*Aspergillus albus tenuissimus*, graminis dactylodis facie, seminibus rotundis; Mich. Gen. 215. t. 91. f. 3. *Mucor crustaceus*; Linn. Sp. Pl. 1656, with an erroneous quotation of Mich. h's letter-press. *M. penicillatus*; Bull. v. 1. 107. t. 504. f. 11.)—Glaucous. Stalk simple. Threads finger-like.—Very common on all kinds of fermenting or corruptible substances, composing greyish uneven tufts, of an extremely delicate and minute structure. The beaded *threads* stand four or five together, radiating, at the top of each common *stalk*. The latter is said by Bulliard to be sometimes branched.

Section 3. *Dispersed, stemless; threads irregularly scattered, moully.*

M. antennata. Perf. n. 12. (*Dematium antenniforme*; Hoffm. Germ. Crypt. 1. 13 f. 4. *Aspergillus cæspitosus*, ex obscuro nigricans, seminibus ovatis; Mich. Gen. 213. t. 91. t. 62.)—Dispersed, black. Joints of the threads ovate.—Common in autumn on the trunks of trees, or on pales, which it renders black in patches. In summer it is said by Perfoon to be, in a young state, tender, more scattered, and almost of an olive colour.

Such minute productions as this, must necessarily be liable to confusion. Those who study *Conseruus*, and look no further, would consider the present as of that genus; Lichenographists might suppose it a *Collema*, destitute of fructification, or more probably a *Lepraria*, consisting of nothing else. The patient observers of these intricate works of creation do great service in collecting them together, even under a confined or partial view of the subject, for the use of those who can consider it on a larger scale; because every body cannot be so laboriously intent on every department of nature.

MONILIFERA, Vaillant's name for the *Osteospermum* of Linnaeus, alluding to the globose form and hard substance of its seeds, which are extremely singular in the class *Syngenesia*. See OSTEOSPERMUM.

MONIMASCA, in *Geography*, a town of Africa, in Cacongo, on the right bank of the Zaire. S. lat. 5° 55'. E. long. 12° 50'.

MONJOUL, a town of Hindoostan, in Bahar; 45 miles E. of Hajypour. N. lat. 25° 34'. E. long. 86° 18'.

MONISTROL DE LOIRE, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Yssengeaux; 19 miles N.E. of Le Puy. The place contains 3913, and the canton 10,453 inhabitants, on a territory of 192½ kilometres, in five communes. N. lat. 45° 17'. E. long. 4° 13'.

MONITORY LETTERS, are letters of warning and admonition, sent from an ecclesiastical judge upon information of scandals and abuses within the cognizance of his court.

MONITOU ISLANDS, in *Geography*. See MONETOU.

MONJUIEH. See MONT-JOUY.

MONJUR, a town of Asiatic Turkey, in Caramania; 20 miles S. of Kirshehr.

MONIY, a river of Brazil, which runs into the bay of Maranhao. S. lat. 2° 40'. W. long. 45° 29'.

MONK, GEORGE, in *Biography* duke of Alpermarle, was son of sir Thomas Monk, and born in 1608. He received his education chiefly from the care of his maternal grandfather sir George Smith, with whom he resided. His father was in reduced circumstances, and having subjected himself to an arrest for debt, the son, indignant at the sheriff's officer who came to serve the process, assaulted and caged him without mercy. To avoid the consequence of this outrage, he entered at the age of seventeen as a volunteer, under

his relation sir Richard Greenville, then about to embark on an expedition against the Spaniards. In this and a following enterprize the success was trifling, and in 1629 he went to serve in the Low Countries, first under lord Oxford, and then under lord Goring, the latter of whom advanced him to the rank of captain. During the following ten years he was present at various sieges and battles, and laid in a stock of professional knowledge, which qualified him for a higher command. He returned home at the commencement of the civil wars, and was engaged in behalf of the king, but he appears, in a short time, to have fallen under suspicion of being inclined to the cause of parliament, and orders had been actually issued to arrest him on his arrival, and his regiment was taken away. He was permitted to go on his parole to Oxford, where he completely justified himself to the king, and was raised to the rank of major-general in the Irish brigade, then employed under lord Byron, in the siege of Nantwich. He was soon made prisoner, and his whole brigade, by Fairfax, and being sent to the Tower of London, was kept in confinement till November 1646. He amused himself, during his leisure, by composing "Observations on military and political Affairs," which he sent in manuscript to lord Liffel, by whose direction they were published after his death. Through the interest of this nobleman, Monk was liberated, on condition of taking the covenant; he went to Ireland, where he was appointed commander-in-chief for the parliament in the north of Ireland, and obliged O'Neal, who was at the head of a rebellion of the natives, to raise the siege of Londonderry. The superiority of the royalists, another party at that time in Ireland, and the unwillingness of the Scotch troops to act with those of the parliament, so embarrassed him, that he found it necessary to make a treaty with O'Neal, and to put Dundalk into the hands of the king's troops, after which he returned to England. The parliament was indignant at this termination, and passed a vote of disapprobation of the treaty with O'Neal, but at the same time so far acquitted Monk, that it was resolved his conduct should not be enquired into. Monk probably never forgave this proceeding, though he soon after accepted a command in Scotland under Cromwell, who formed a regiment for him, and made him lieutenant-general of artillery. He performed several important services for the government, and when Cromwell left Scotland in pursuit of Charles II., Monk was left to command in that country at the head of 7000 men. In this station he acted with vigour and success: besieged and took Stirling castle, whence he sent all the records of the kingdom to London. He stormed Dundee, and, in imitation of Cromwell in Ireland, put the governor, and all the men in arms, to the sword. This example of savage severity deterred other places from resistance, and he became master of the whole country, with the exception of some of the inaccessible parts of the Highlands. His health declined, and in 1652 he was obliged to go to Bath, but on his recovery he returned to Scotland, as one of the commissioners for its union with the English commonwealth.

The Dutch war, in the mean time, broke out, and in 1653 Monk was transferred to the sea-service. "He was now," says Dr. Campbell, in his Lives of the Admirals, "nearly forty-five years of age, which seemed a little of the latest to bring a man into a new scene of life, yet it must be remembered, that he was bred in a maritime country, and had served at sea in his youth; so that the preferment was not absolutely out of his way; or if it was, he soon made it appear that he could easily accommodate himself to any service that might be beneficial to his country." In June 1653 he engaged, with the fleet, of which he had the command,

the Dutch fleet: and being on board the *Resolution* with admiral Deane, who in the very beginning of the action was killed by a chain-shot, a new invention ascribed to De Witte, Monk with great presence of mind threw his own cloak over the dead body, and having taken two or three turns on the deck, and encouraged the men to do their duty, ordered it to be removed into his cabin. The contest lasted two days, and at length terminated in a complete victory obtained by the English. Soon after Van Tromp had fitted out another fleet, with which, on the 29th of July, he engaged the English under Monk. The Dutch admiral was killed in the action, and a most decisive victory accrued to the English, testified by the capture or destruction of more than thirty ships, and the moment the result was known the States General were obliged to send their ministers here to conclude a peace upon any terms that could be obtained. At an entertainment subsequent to the thanksgiving for this victory, Cromwell, now protector, with his own hand put a gold chain around the neck of his successful admiral. After this he was employed again in Scotland, and conducted the government with which he was entrusted, so as to conciliate the personal good-will of the nation, however disaffected in their hearts, to the rule to which they were forced to submit. His former attachment to the royal cause excited some distrust of him on the part of Cromwell, and some hopes of him in the royalists, but he was very cautious, and took care to give no ground of suspicion by his actions. By his letters, and by his conduct, there seems now no doubt that he was steadily and strongly attached to Cromwell, to whom he not only communicated all that he could discover of the king's intelligence with others, but sent him also a copy of the letter, written by king Charles II. to himself, which for a considerable time was considered as a proof of Monk's early affection for the king's service, a supposition that is now clearly and absolutely overturned. Cromwell, however, was suspicious of him to the last, and but a short time before his death he wrote the general, or admiral, a long letter, concluding with the following postscript, "which," says the discerning Campbell, "I conceive affords us a better picture of Oliver than is any where to be met with, and which is no less singular, drawn by his own hand:"

P.S. "There be that tell me, that there is a certain cunning fellow in Scotland, called GEORGE MONK, who is said to lie in wait there to introduce CHARLES STUART. I pray you use your diligence to apprehend him, and send him up to me."

Immediately on the death of Oliver, Monk proclaimed Richard, from whom he received a very kind letter, which among other things said, "that his father had directed him to be governed chiefly by his advice." To this, Monk returned a prudent answer, but did not commit himself: he foresaw that Richard would not be able long to maintain his authority, and was unquestionably preparing to act according to circumstances. But whatever were his private views, no politician could have kept them more closely concealed. His relation and early patron, sir John Greenville, sent the general's brother to him in Scotland, with a letter from the king, soliciting his support; but though he received his brother with kindness, he sent him back with no confidential communication on the subject. Lambert, his principal rival, was at this period possessed of the chief influence over the army in England. By direction of the Committee of Safety, who now held the reins of government, he marched northwards with the view of overawing Monk. The latter, to gain time, dispatched commissioners to London to treat of an accommodation, and in the mean while the parliament re-

sumed

tained its authority. Monk set out on his journey to the metropolis: his character was to highly estimated, that he received addresses on all sides requesting that he would use his influence, and exert his powers, in settling a legal and equitable government. On his arrival he took his quarters in Westminster, affecting a perfect and unlimited obedience to the existing parliament, and even caused some of their orders to be executed which revolted against his own mind. At length he complained of the odious service forced upon him, and required the House, in a peremptory manner, to issue writs for assembling a new and a free parliament. This was the death warrant to the long, or rump parliament, and the general rejoicings that were made on the occasion sufficiently proved the odium which that assembly had incurred with the nation. Every thing now manifestly tended to the restoration of monarchy, and yet Monk still maintained the appearance of attachment to republican principles, and allowed, at least openly, no channel of communication between him and the king. At length the general unboasted himself to a person by the name of Morrice, a relation and intimate friend, and through his means sir John Greenville was admitted to a conference with the general, and entrusted with a verbal message to the king, consisting of assurances of fidelity, and advice for his conduct. Thus was the restoration begun, prosecuted, and perfected by Monk, who assisted, on the 8th of May, 1660, at the proclamation of Charles II. in the capital. On the landing of the king at Dover, he was met by the general, who was hailed by Charles and his brother with all the distinction justly due to one who had been so instrumental in the great event. It was unquestionably regarded as an additional benefit conferred on the sovereign, though perfectly unjustifiable on the part of Monk, that he discouraged and opposed all all those limitations of the royal power and prerogative which some of the best and most judicious friends to political liberty had proposed, and insisted that his restoration should be unconditional. His rewards, as was natural, soon followed, and they were as ample as a subject could expect. His titles, preferments, and fortune he received as favours from the king, all which he might, perhaps, have received in another way, as a very large party in the country would have gladly made him Oliver's successor, but as Campbell expresses it, "Monk generously despised a diadem to which he had no right, and with equal greatness of mind, refused to make any terms with him to whom it belonged, chusing to leave the king's power, and the people's freedom, to be discussed in the only assembly that could have a right to meddle with them." He was created a knight of the Garter, was admitted into the privy-council, made master of the horse, gentleman of the bed-chamber, first commissioner of the treasury, and created duke of Albermarle, with the grant of a landed estate of 7000*l.* per annum. His vast elevation he bore with the modesty and discretion that seemed to be inherent in his disposition. He sat as one of the commissioners for the trial of the regicides, an office which, it is hoped, he undertook with a view of moderating the ferocity of others connected with him, in the same commission. As for Monk, he conducted himself with at least the appearance of humanity in every case, except in the production of private letters from the marquis of Argyle on the trial of that nobleman, and for this he has been justly censured. The question respecting the production of these letters, to the prejudice of the marquis of Argyle, has been lately discussed with much eagerness. Mr. Fox, in his posthumous historical work, has no doubt of the fact, and he speaks of Monk, with that indignation which he was always known to feel for baseness and hypocrisy. He says, "All depended

upon the army, and that army had fallen into the hands of one, than whom a baser could not have been found in its lowest ranks. Personal courage appears to have been Monk's only virtue; reserve and dissimulation made up the whole stock of his wisdom." Mr. Rose endeavours to vindicate the character of the general, but his arguments are feeble, and his reasoning inconclusive. Mr. Serjeant Heywood, in his "Vindication of Mr. Fox's Historical Work," relates very fully and clearly the arguments, for believing that Monk was guilty of the charge imputed to him with respect to the unfortunate marquis. He proves, in the most satisfactory manner, that it is highly probable Monk did receive letters from Argyle which might affect his life, and then offers strong reasons to shew that he most likely produced them to the parliament, which was sitting in judgment on the marquis. Of Monk, the learned serjeant says, "though not guilty of the precise crime for which they [the regicides] were to be tried, he had waded to his dukedom through bloodshed, duplicity, and crimes." And he further adds, "he probably became the restorer of monarchy, only because he was disappointed in the hope of succeeding to the protectorate, on the abdication of Richard. He had recently acted with some of those who were brought before him for trial, and his crimes deserved the same punishment which he unblushingly concurred in inflicting upon theirs." On this subject we refer our readers for more ample information to Heywood's "Vindication," and to the Monthly Review, vols. lix. and lxxix. p. 366, 367.

Monk joined the lord chancellor Hyde in the constitutional measure of disbanding the army, with an exception in favour of his own regiment: and he was chiefly instrumental in the suppression of the insurrection of the Fifth-monarchy men. At the breaking out of the Dutch war in 1664, he exerted all his powers in refitting and manning the fleet, and was appointed joint-admiral of the fleet with prince Rupert. The two commanders put to sea in April 1666, and fell in with the Dutch under the younger Tromp and De Ruyter. By the duke's advice prince Rupert took a division of the fleet to oppose that of the French, which was coming to the aid of the Dutch. The English was now much inferior in number to their enemy, but the duke of Albermarle did not hesitate to begin the attack on the 1st of June, and a most bloody engagement ensued, which lasted four days. On the first three, the English, much inferior to the enemy, were obliged to make a retreating fight, the duke himself closing the rear, with the full resolution of blowing up his ship rather than be taken. On the fourth, the return of prince Rupert enabled the English to face about, and a fresh action ensued, at the end of which they retired to their harbours, having been on the whole the principal sufferers. A new combat, by the same commanders on both sides, on the 25th of July, ended to the disadvantage of the Dutch; after which the duke of Albermarle came home and struck his flag. The daring enterprize of the Dutch in 1667, who sailed up the Thames, and burnt some ships at Chatham, called forth the exertions of this veteran once more, who exposed himself to danger in their defence. At this time he was much out of health, being affected with symptoms of dropsy, which put a period to his life, in January 1670, in the 62^d year of his age. His remains were deposited, with great funeral pomp, in Henry VIIIth's chapel, in Westminster Abbey. Biog. Brit. Hume's Hist. Stockdale's edition of Campbell's Lives of the Admirals, vol. ii.

MONK, anciently denoted a person who retired from the world to give himself up wholly to God, and to live in solitude and abstinence.

The word is derived from the Latin *monachus*, and that from the Greek *μοναχος*, *solitary*, of *μονος*, *solus*, *alone*; because the ancient monks lived in solitude, as the true monks still do.

Such were the hermits and anachorets, who withdrew into deserts, and lived remote from all commerce of mankind.

Some writers, as father Helyot, (Dissert. Prelim.) trace the origin of monks up as early as the time of the Therapeutæ; and maintain, that there had been an uninterrupted succession of monks from the Therapeutæ to St. Anthony. Others, on the contrary, are contented with going back as far as St. Paul the Hermit.

The original of monks seems to have been this. The persecutions which attended the first ages of the gospel, forced some Christians to retire from the world, and live in deserts and places most private and unfrequented, in hopes of finding that peace and comfort among beasts, which were denied them among men. And this being the case of some very extraordinary persons, their example gave so much reputation to retirement, that the practice was continued when the reason of its commencement ceased. After the empire became Christian, instances of this kind were numerous, and those, whose security had obliged them to live separately and apart, became afterwards united into societies. We may also add, that the mystic theology, which gained ground towards the close of the third century, contributed to produce the same effect, and to drive men into solitude for the purpose of enthusiastic devotion.

In this kingdom many persons might seek this kind of refuge, during the persecution of Diocletian about the year 303, and in those perilous and afflictive times, when the Romans oppressed the Britons, and when their situation was rendered more distressing by the invasion of the Scots from Ireland, the Picts and Attacots from the north, and the Saxons and Franks from the east and south.

The monks, at least the ancient ones, were distinguished into *solitaries*, *cœnobites*, and *sarabaites*.

The *solitary* are those who live alone, in places remote from all towns and habitations of men, as do still some of the hermits.

The *cœnobites* are those who live in community with several others in the same house, and under the same superiors.

The *sarabaites* were strolling monks, having no fixed rule or residence.

The houses of monks again were of two kinds, *viz.* *monasteries*, and *lauræ*. See MONASTERY, and LAURA.

Those we call monks now-a-days are *cœnobites*, who live together in a convent or monastery, who make vows of living according to a certain rule established by the founder, and who wear a habit which distinguishes their order.

Those that are endowed, or have a fixed revenue, are most properly called monks, *monachi*; as the Chartreux, Benedictines, Bernardines, &c. The Mendicants, or those that beg, as the Capuchins and Franciscans, are more properly called *religious*, and *friars*; though the names are frequently confounded.

The first monks were those of St. Anthony; who, towards the year 305, formed them into a regular body, engaged them to live in society with each other, and prescribed to them fixed rules for the direction of their conduct. These regulations, which Anthony made in Egypt, were soon introduced into Palestine and Syria by his disciple Hilarion. Almost about the same time, Aones, or Eugenius, with their companions Gaddanas and Azyzas, instituted the monastic order in Mesopotamia, and the adjacent countries; and their example was followed with such rapid success, that, in a short time, the whole East was

filled with a lazy set of mortals, who, abandoning all human connexions, advantages, pleasures, and concerns, wore out a languishing and miserable life amidst the hardships of want, and various kinds of suffering, in order to arrive at a more close and rapturous communication with God and angels. From the East this gloomy institution passed into the West, and first into Italy and its neighbouring islands; though it is uncertain who transplanted it thither. St. Martin, the celebrated bishop of Tours, erected the first monasteries in Gaul, and recommended this religious solitude with such power and efficacy, both by his instructions and his example, that his funeral is said to have been attended by no less than 2000 monks. From hence, the monastic discipline extended, gradually, its progress through the other provinces and countries of Europe. There was, however, a great difference in point of austerity between the western and oriental monks; for the former could never be brought to bear the severe rules to which the latter voluntarily submitted; and the reason of this difference may be partly derived from the nature of the respective climates in which they dwell. The European countries do not so much abound with delirious fanatics, and with persons of a morose and austere complexion, as those arid regions that lie towards the burning east; nor are our bodies capable of supporting that rigid and abstermious method of living, which is familiar and easy to those who are placed under a glowing firmament, and who breathe in a sultry and scorching atmosphere. It was, therefore, the name, more than the thing itself, that was transported into the European countries; though this name was indeed accompanied with a certain resemblance or distant imitation of the monastic life instituted by Anthony and others in the East. There were besides the monks of St. Basil, called in the East, *Calogeri*, from *καλος* *γερων*, *good old man*, and those of St. Jerome, the hermits of St. Augustine, and afterwards those of St. Benedict and St. Bernard, at length came those of St. Francis and St. Dominic, with a legion of others; all which see under their proper heads, BENE-DICTINES, &c.

Towards the close of the fifth century, the monks, who had formerly lived only for themselves in solitary retreats, and had never thought of assuming any rank among the sacerdotal order, were now gradually distinguished from the populace, and endowed with such opulence and honourable privileges, that they found themselves in a condition to claim an eminent station among the supports and pillars of the Christian community. The fame of their piety and sanctity was so great, that bishops and presbyters were often chosen out of their order; and the passion of erecting edifices and convents, in which the monks and holy virgins might serve God, in the most commodious manner, was at this time carried beyond all bounds. However, their licentiousness, even in this century, was become a proverb; and they are said to have excited the most dreadful tumults and seditions in various places. The monastic orders were at first under the immediate jurisdiction of the bishops, from which they were exempted by the Roman pontiff, about the end of the seventh century; and the monks, in return, devoted themselves wholly to advance the interests, and to maintain the dignity of the bishop of Rome. This immunity which they obtained was a fruitful source of licentiousness and disorder, and occasioned the greatest part of the vices with which they were afterwards so justly charged. In the eighth century the monastic discipline was extremely relaxed both in the eastern and western provinces, and all efforts to restore it were ineffectual. Nevertheless, this kind of institution was in the highest esteem, and nothing could

equal the veneration that was paid, about the close of the ninth century, to such as devoted themselves to the sacred gloom and indolence of a convent. This veneration induced several kings and emperors to call them to their courts, and to employ them in civil affairs of the greatest moment. Their reformation was attempted by Lewis the Meek, but the effect was of short duration. In the eleventh century they were exempted by the popes from the authority of their sovereigns, and new orders of monks were continually established; inasmuch that in the council of Lateran, that was held in the year 1215, a decree was passed, by the advice of Innocent III. to prevent any new monastic institution, and several were entirely suppressed. In the fifteenth and sixteenth centuries, it appears from the testimonies of the best writers, that the monks were generally lazy, illiterate, profligate, and licentious epicureans, whose views in life were confined to opulence, idleness, and pleasure. However, the reformation had a manifest influence in restraining their excesses, and rendering them more circumspect and cautious in their external conduct.

Monks are distinguished by the colour of their habits into *black, white, grey*, &c. Among the monks, some are called *monks of the choir*, others *professed monks*, and others *lay monks*; which last are destined for the service of the convent, and have neither clericate nor literature.

MONKS, *Cloistered*, are those who actually reside in the house; in opposition to *extra monks*, who have benefices depending on the monastery.

Monks are also distinguished into *reformed*, whom the civil and ecclesiastical authority have made matters of ancient convents, and put in their power to retrieve the ancient discipline, which had been relaxed; and *ancient*, who remain in the convent, to live in it according to its establishment at the time when they made their vows, without obliging themselves to any new reform.

Anciently, the monks were all lay-men, and were only distinguished from the rest of the people by a particular habit, and an extraordinary devotion. Not only the monks were prohibited the priesthood, but even priests were expressly prohibited from becoming monks, as appears from the letters of St. Gregory. Pope Symiacus was the first who called them to the clericate, on occasion of some great scarcity of priests, that the church was then supposed to labour under: and since that time the priesthood has been usually united to the monastic profession.

MONKS, *Professed*. See PROFESSED.

MONKS, *Proprietary*. See PROPRIETARY.

MONK *Fish*, called also *Angel-fish*, in *Ichthyology*, a species of *squalus*. See SQUALUS *Squatina*.

MONK'S *Hood*, a name given to several species of aconite, or wolf's-bane. See ACONITUM.

MONK'S *Rhubarb*. See RHUBARB, and RUMEX.

MONK'S *Seam*, among *Sailors*, is, when the selvages of sails are laid a little over one another, and sewed on both sides.

MONKAH, in *Geography*, a town of Bengal; eight miles S. of Palamow.

MONKEARY, a town of Bengal; 20 miles S.S.E. of Palamow.

MONKEDOO, a town on the W. coast of Borneo. S. lat. 2° 40'. E. long. 109° 51'.

MONKEY, in *Zoology*, a name given by way of distinction to those apes which have tails; the others, or those without tails, being more properly called *apes*.

The same distinction holds in Latin, the tailed ones being called *papiones* or *baboons*, when they have short tails; *cercopithecus*, when their tails are longer; and those without tails *simia*. See CERCOPITHECUS and SIMIA.

MONKEY of the *West Indies*. See GUARIBA, and SIMIA *Heulzebb*.

MONKEY, *Green*. See CALLITHRICHUS, and SIMIA *Sabaot*.

MONKEY, in *Ship-Building*, a machine for driving bolts where more force is required than the common method, by a mallet. It is composed of a long pig of iron traversing in a groove, or in a frame, with handles, with a groove on the underside, and slides upon a ridge of iron fixed in a bed. The whole is fixed to centre the bolt to be driven, and then the monkey is forcibly drawn, to strike the bolt, by ropes and pulleys.

It also denotes the stand for the pinion and winch-handle, which draw the lock-paddles in a canal, &c. *Plate V. Canals*, fig. 38 and 39, k, l.

MONKEY-*Boat*, a name sometimes applied to a long narrow sort of boat.

MONKEY-*Blocks*, in *Ship-Building*. See BLOCKS.

MONKEY'S *Bread*, in *Gardening*. See DANONIA.

MONKEY-*Flower*, the common name of a flower plant. See MIMULUS.

MONKEY-*Island*, in *Geography*, a small island in Currituck sound, near the coast of North Carolina. N. lat. 36° 22'. W. long. 76° 4'.

MONKEY-*Key*, a small island in the bay of Honduras, near the coast of Mexico. N. lat. 16° 25'. W. long. 89° 35'.

MONKEY-*Point*. See PUNTA *Chica*.

MON-KIEU-TCHIN-HOTUN, a town of Corea. N. lat. 43° 1'. E. long. 129° 50'.

MONKTON, a post-town of America, in Addison county, Vermont, E. of Ferrisburg; containing 1080 inhabitants.—Also, a township of Annapolis county, in Nova Scotia, inhabited by Acadians, and a few families from New England; it consists chiefly of wood-land and salt-marsh, and contains about 60 families.

MONLIRAS, a town of the island of Cuba; 45 miles E. of Bayamo.

MONMOUTH, a large maritime county of New Jersey, in the United States, of a triangular shape; 80 miles in length, and from 25 to 40 in breadth; it is divided into six townships, and contains 19,872 inhabitants, including 1633 slaves. The face of the country is generally level, with few high lands, the most noted of which are Navesink and Centre-hill. The soil is for the most part sandy; but other parts are fertile. At the mouth of Navesink river there is a curious cave, now in a ruined state, 30 feet long, and 15 wide, containing three arched apartments.

MONMOUTH, or *Freehold*, a post-town and capital of the fore-mentioned county, situated 22 miles N.E. by E. of Allentown, 34 E. of Trenton, and 64 N.E. by E. of Philadelphia. It contains a court-house, gaol, and a few compact dwelling houses, with a Presbyterian and Baptist meeting-house.

MONMOUTH, a post-town of Lincoln county, on the E. side of Androscoggin river; 49 miles N. of Portland, containing 701 inhabitants.

MONMOUTH, *Capo*, lies on the E. side of the straits of Magellan.

MONMOUTH-*Island*, one of the four islands of Royal Reach, in the straits of Magellan, and the second from the westward.

MONMOUTH-*Island*, one of the Bashee islands in the East Indian sea.

MONMOUTH, a market-town and borough in the hundred of Scenfreth and county of Monmouth, England,

MONMOUTH.

land, stands on a narrow peninsula, formed by the confluence of the rivers Monnow and Wye. It is a town of great antiquity, and according to Horsley (in his *Britannia Romana*) was the *Blestium* of Antoninus. No Roman remains, however, have been found here to corroborate this opinion, which, though probable, is chiefly founded on the fact of the coincidence of distances between that and the connecting stations, northward and southward, with the actual distances between those and the present site of Monmouth. The castle at this place is mentioned in ancient records as being one of the strong holds garrisoned by the early Saxons, to secure their conquests of the country between the Severn and the Wye; and to curb the depredatory incursions of the Welsh. Very little, however, besides this bare fact, is known concerning this fortress, till the era of the Norman conquest, when it appears, from a passage in *Domesday* book, to have belonged to the king. William, the son of William Fitz-Baderon, to whom four "carucates of land in the castle of Monmouth, part of the royal demesne, were given in custody" about this time, took the surname of *de Monmouth*, from the place, which continued in the possession of his descendants till the reign of Henry III., when John *de Monmouth* became the proprietor. During the reign of that monarch, which is recorded to have been one continued scene of civil strife, this fortress was occasionally besieged and occupied by both parties; and was ultimately resigned, together with the honour, to prince Edward and his heirs for ever, in consideration of certain lands granted for life. The prince soon afterwards surrendered it to the king, who bestowed it on his younger son Edmund, earl of Lancaster, from whom it descended to John of Gaunt, king of Castile and duke of Lancaster, who, as well as his son, Henry of Bolingbroke, (afterwards Henry IV.) made it their favourite residence. Henry V., the celebrated hero of Agincourt, was born in one of the rooms of Monmouth castle in the year 1387, and seems also to have passed his infancy here. This castle subsequently became the property of Henry VI. as part of the duchy of Lancaster, which had descended to him by inheritance. Upon his dethronement and attainder, it fell to Edward IV., who granted it to William, lord Herbert, whom he created earl of Pembroke; but having once more reverted to the crown, Henry VII. possessed it by the same right that he ascended the throne. Since that period, the castle has become private property, but at what date its alienation from the duchy took place is not ascertained. Previously, however, to the close of the 17th century, we find it in the possession of Henry, the first duke of Beaufort, and it is now the property of his illustrious descendant, the present duke.

Under the auspices of its lords, Monmouth early became a privileged place, and particularly enjoyed many immunities as forming a parcel of the duchy of Lancaster. The earliest charter, however, which appears in the archives, is dated in the year 1549, and was granted by the monarch then reigning "to the burgesses of his burgh and town of Monmouth, in the marches of Wales, and within his duchy of Lancaster." This deed confirms various franchises and privileges bestowed upon the inhabitants by Henry VIII.; and in addition confers the power of electing a mayor and two bailiffs. Since that time therefore Monmouth has been governed by officers under that denomination, who are assisted by a common council, composed of eighteen members.

The situation of this town is extremely pleasant and highly picturesque: it stands near the extremity of an expanded vale, surrounded by gentle hills and swelling eminences, either covered to their summits with rich woods, or

laid out in fields of corn and pasture. It is a place of considerable extent, and contains many respectable buildings, but has only one principal street, which leads from the bridge over the Monnow, to the market place. In this street stands the town-hall, an edifice of modern erection, built upon pillars, which form a handsome colonnade. A statue of Henry V. is placed in a niche over the front entrance. The other streets are mostly narrow. One of them leads from the market place to St. Mary's church. That edifice formerly belonged to an alien priory for black monks of the Benedictine order, an institution which was founded in the time of Henry I. by Wilhenoc, grandson of Fitz-Baderon and third lord of Monmouth. Only a few vestiges of the monastery can now be discovered a little to the north of the church, which, with the exception of the tower and spire, is entirely a new building. The church of St. Thomas, now subordinate to St. Mary's, is an ancient structure. Coxe, in his historical tour through this county, says, "that the simplicity of its form, the circular shape of the door-ways, and of the arch separating the nave from the chancel, and the style of their ornaments, which bear a Saxon character, seem to indicate that it was built before the conquest." Some authors even suggest, that there is a probability of the more ancient parts being of British origin. It is certainly, for Wales, a most curious specimen of early architecture; and in no mean degree deserves the attention of the antiquary, particularly the semi-circular arch of the northern door-way.

The county gaol is a new massive edifice, well adapted to its purpose; the apartments are airy; and much attention is paid to the health and morals of the prisoners. This building stands at one extremity of the town, on the banks of the Monnow. Here is a free school founded by William Jones in the reign of James I.; also an alms-house for 20 poor people, established and endowed by the same individual.

The remains of walls, lines of circumvallation, curtains, bastions, and other works of defence, clearly shew that this town must have been, at one time, a strongly fortified place, and from its situation, there is little doubt but it might easily be made so again. On those sides which were unprotected by the river, it has been evidently environed by strong walls, and a deep fosse capable of being filled with water. It had four gates, only one of which is now standing. The suburb of St. Thomas was defended in the same manner as the town, with which it communicated, as now, by a stone bridge with balustrade-towers on each side thrown over the Monnow. There are two other bridges in the immediate vicinity of the town, the Wye-bridge and Tibb's-bridge; the former of which is constructed of stone, and the latter of wood.

The ruins of the castle of Monmouth, the ancient residence of its powerful lords, are discovered occupying the ridge of an eminence situated between the market place and the river Monnow. From a view of these it is evident, that this fortress has been the work of several and even distant periods. Some portions of them bespeak a Saxon if not a Roman origin, while others are of a date posterior to the reign of Henry III. The massive structure of part of the walls is particularly remarkable, being from six to ten feet thick, and are composed of pebbles and liquidated cement, so closely compacted as not to yield in hardness to stone itself. The chamber, in which king Henry was born, is wholly demolished, but some of the beams, which supported the flooring, still remain visible. Adjoining to it is a large apartment, which probably formed the baronial hall, and was afterwards used for the county assizes till about the middle

middle of the last century. A handsome domestic edifice, constructed of stone, stands in the middle of this vast pile of ruins. From the date over the principal door it appears to have been built in 1673, for the occasional residence of the Beaufort family. Two hospitals, founded here by John de Monmouth about the year 1240, are now entirely levelled with the ground.

The manufactures of Monmouth, at the present period, are trifling; so that the inhabitants are chiefly supported by the navigation of the river Wye, the trade with Hereford and Bristol, the supply of the neighbouring district with various kinds of shop-goods, and the number of persons of independent fortune, who reside either constantly or occasionally in the town, or its vicinity. The paring and cleansing of bark brought from the forests of the Upper Wye, for the purpose of exportation, constitutes, during the season, the employment of a number of men, women, and children among the lower ranks. But though fallen in respect of its manufacturing importance now, Monmouth seems to have carried on a very considerable trade some centuries ago.

Monmouth caps are celebrated by Shakspeare in his play of Henry V.; "If your majesties is remembered of it, the Welshmen did goot service in a garden, where leeks did grow, wearing leeks in their Monmouth caps." Fuller likewise praises them highly, by calling them the most "ancient, general, warm, and profitable coverings of men's heads in this island." The old ballad of the caps, printed in "The Antidote against Melancholy," says,

"The soldiers that the Monmouth wear,
On cattles' tops their ensigns rear."

Monmouth has sent one member to parliament since the reign of Henry VIII. The right of election is in the burgessees inhabitants, in conjunction with the burgessees inhabitants of the towns of Newport and Usk, as decided by the house of commons on a petition of right in 1680. According to the parliamentary returns of 1801, the population of this town then amounted to 3345 persons, but Mr. Coxe, in his "Historical Tour," fixes it at about 2600 souls.

The vicinity of this town displays much beautiful and interesting scenery. The views from the high conical hill, called the Kymin, are particularly fine, extensive, and diversified. A walk leads to the summit of this hill, which terminates in a level plain crowned with a wood, through which six vistas have been cut. Each of these exhibits in fine perspective a rich, grand, and varied prospect, of an expansive tract of country. In the centre of the wood, a pavilion, intended for a naval monument, has been lately erected by subscription. It is a circular edifice, consisting of two stories, and built in the form of an embattled tower. The frieze round it is ornamented with medallions of the most eminent British admirals, accompanied with emblematical and appropriate devices. The view from the summit of this pavilion is perhaps the finest and most extensive in England, embracing a circumference of nearly 300 miles, and including within its range all the materials of sublime and beautiful scenery.

Troy-house, the ancient seat of the family of Herbert, and afterwards of that of Somerset, is situated about a mile from the town on the banks of the Trothy, from which river its name is corruptly derived. Of the original edifice few traces can now be discovered, except an old gate-way with a pointed arch. The present mansion was built under the direction of the celebrated Inigo Jones, but though

well proportioned and commodious, it possesses no features of peculiar beauty. This place was formerly much famed for its excellent and luxuriant gardens, particularly in the time of Charles I when they were the property of sir Thomas Somerset, brother to the marquis of Worcester. Two miles west from hence is a Treowen, the seat of the Jones family, but now converted into a farm-house. In the parish of Lanvihangel Tavanbarch, at the distance of three miles to the north, stand the remains of Grace-Dieu abbey, which was founded by John of Monmouth in the year 1229. In the parish of Landeilo Cressney appear the magnificent ruins of White Castle, anciently called Landeilo castle, or Castell-Gwin. This fortress, at the time of the conquest, formed part of the possessions of Brian-Fitz-count, earl of Hereford, from whom it came, first to the Cantalopes, and afterwards to the Braoses. Coxe's Historical Tour through Monmouthshire, 4to. 1801. Beauties of England and Wales, vol. x.

MONMOUTHSHIRE, one of the western counties of England, is bounded on the south-east by the Severn sea or Bristol channel; on the west by Glamorganshire and part of Brecknockshire; on the north by part of the latter county, and that of Hereford; and on the east by Gloucestershire. It extends about 33 miles in length, and 20 in breadth, and comprises, according to the latest surveys, an area of 550 square miles, or 352,000 acres. By the returns made to parliament in 1801, it contained 9365 houses, and a population of 45,582 inhabitants. The whole county is now divided into six hundreds: Scenfreth, Abergavenny, Wentloog, Caldecot, Usk, and Raglan; and comprehends 127 parishes, and seven towns. The latter are Monmouth, Caerleon, Chepstow, Usk, Abergavenny, Newport, and Pontypool. All the parishes, with respect to ecclesiastical jurisdiction, are included in the province of Canterbury, and also in the diocese of Landaff, with the exception of six, viz. Welsh-Bicknor, Dixon, and St. Mary's being in the diocese of Hereford; and Oldcastle, Llanthoay, and Cwmyoy, belong to St. David's.

At the period of the Roman invasion Monmouthshire formed part of the territory inhabited by the Silures, who, besides this district, possessed the counties of Glamorgan, Brecknock, Radnor, Hereford, and such parts of Gloucestershire as lay between the Severn, the Teme, and the Towy. On the division of Britain into provinces by the Romans, this county was included in Britannia Secunda. From the period at which these illustrious conquerors left our island, till the establishment of the Saxon heptarchy, the history of Monmouthshire, in common with that of almost every portion of Britain, is uncertain and contradictory. In the legends of these times, however, it makes a most conspicuous figure. Many of the heroic exploits of Uther Pendragon, and of the celebrated Arthur, are said to have taken place within its boundaries. Caerleon was long the capital of the British dominions, and is frequently described by the bards as equalling Rome in splendour and magnificence. After the full establishment of the Saxon power in England, this county seems to have formed a petty principality of itself, under the name of Gwent, whose princes were sometimes bold enough to aspire at independence, but who, for the most part, paid tribute to the princes of South Wales. The invincible courage which had marked their character at a more remote period, still continued in full force during this era, and opposed a most effectual barrier to the attempts of the Saxon monarchs to subjugate the principality. Canute, the Dane, entered Gwent with a powerful army, in the year 1034, but though he defeated Rytherch-ap-Jestin, prince

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of South Wales, he was unable to hold possession of the country. It was not, indeed, till the reign of Edward the Confessor, that the Gwentians could be regarded as conquered, when Harold, having penetrated into the heart of Wales, forced the inhabitants to swear fealty to the crown of England, and retained military possession of this county, in order the more effectually to secure the advantages he had gained. The Norman invasion, however, was the signal to all the Welsh tribes for renewing the war, and throwing off the yoke which had been thus imposed. In order again to reduce them, the conqueror, too politic to weaken his own army in such a warfare as Wales presented, encouraged his powerful barons to make incursions into that country at their own expence, and with their own retainers, and, as a reward, granted them the privilege of holding the lands they conquered in capite. Monmouthshire was accordingly overrun in this way after a long and bloody struggle for its independence; but the conquerors having built numerous castles and fortresses in order to overawe the inhabitants, soon began, in their turn, to arrogate to themselves an independent authority. Continual disputes took place betwixt them, with respect to the extent and boundaries of their lands, which not unfrequently terminated in open hostility to each other, and even to the crown of England. The power possessed by these barons marchers, within the limits of their property, was little inferior to that of a prince. They held courts and administered justice at will to their tenants and dependants, in all questions both civil and criminal. This system of jurisprudence, perhaps the most wretched and deplorable that could possibly be adopted, continued in this county, as well as in the other marches of Wales, till the reign of Henry VIII., when the government of the lords marchers was abolished, and Monmouthshire was detached from the principality, and included among the counties of England. The statute, however, authorising this change, does not seem to have been immediately acted upon, for we find Monmouth regarded as a Welsh county so late as the reign of Charles II., when it first began "to be reckoned an English county, because the judges kept the assizes here on the Oxford circuit." From this circumstance it is difficult to fix, precisely, the period at which Monmouthshire might be strictly considered as an English county: probably, however, not before the jurisdiction of the supreme "court of lords marchers," usually held at Ludlow, was finally abolished in the first year of William and Mary.

The general aspect of Monmouthshire presents to the eye a continual recurrence of hill and dale, wood and water, corn fields and meadows; "the sublime of wildly magnificent, and the beauty of mild and cultivated scenery combine to delight the traveller at every turn he makes in this uncommonly diversified district." Nor is the air less favourable to health, than the face of the country is interesting to the view. Except on the more elevated ridges, which are no doubt cold and bleak, it is, for the most part, mild and temperate. It is a remarkable circumstance, that the fogs here, during winter, shift periodically; so that it is no uncommon thing to see the hills enveloped several days with a thick fog, while the valley beneath has the splendour of a genial sun: but on a sudden these effects are entirely reversed; the fog descends into the valley, and the mountains are, in their turn, left open to the rays of heaven. Monmouthshire abounds with rivers, of which the principal are the Severn, the Wye, the Usk, the Rumney, the Monnow, or Mynwy, and the Ebwy. The Wye is particularly remarkable for the beauty and variety of its scenery, exhibiting a continued series of enchanting views, which have

been amply descanted on by Gilpin, Ireland, Warner, and many other tourists; and latterly by Bloomfield, in a poem expressly devoted to the subject. (See WYE.) The Usk likewise displays many charming scenes, and when swelled by mountain torrents spreads itself out into expansive lakes, and occasionally inundates the adjacent country. This river is navigable for barges up to Tredonnoe-bridge. There is only one canal in this county, which was begun in 1792, and finished in 1798. It enters Monmouthshire from Brecknockshire, and divides it nearly into two equal parts, passing in its course close to the towns of Abergavenny and Pontypool, and falls into the estuary of the Usk at a short distance below Newport. About a mile above that town, a branch strikes off to Cramlin-bridge, near Llanhiddel, where it terminates. Still further to facilitate the conveyance of the more weighty articles which this county produces, rail-roads have been formed in different parts of it. One, which connects the iron-works at Blaenavon with the canal at Pontnewydd, is particularly remarkable. It only extends five miles and a quarter in length, and rises no less than 610 feet. The roads in Monmouthshire, with the exception of those from New-Passage to Newport, Caerdiff, and Usk, and thence to Abergavenny, were, till lately, proverbially bad; and though improved, are capable of still further amendment.

Monmouthshire, considered in an agricultural point of view, may be properly divided into three districts. The first, comprising the southern part of the county, consists, almost entirely, of moor, or marsh lands, with a portion of meadow-grounds. The second division, which takes in the eastern line of the county, is particularly fertile. The third division forms the western and most hilly part of the county. The kinds of corn generally raised are wheat, barley, and oats, with a very small proportion of peas and beans. These are, of course, principally produced in the eastern division, the other two being much more pastoral, or grazing, than farming districts. The cattle reared are oxen, sheep, and mules. The first are principally bred in the northern parts, and fed in the southern. These generally grow to a large size, are extremely docile, and well fitted for the labours of the field. The sheep are naturally of an inferior kind, but the flock has been greatly improved of late years, by various crosses with the Cotswold, Southdown and Dorset breeds. Mules are very abundant here, and are a peculiarly fine race, strong in the bone, and of exquisite symmetry, running from fourteen to sixteen hands high, and are so valuable as to sell for thirty or forty pounds each. The breed is constantly kept up to its pristine standard of excellence by the importation of stallion asses from Spain. But whether this traffic should be encouraged is extremely doubtful, considering the superior qualifications of the horse, the breeding of which animal is, in consequence, almost wholly neglected in this county. Indeed the Monmouthshire horses are by far the most miserable race of their species in our island, neither adapted for the saddle, nor useful for agricultural purposes.

Monmouthshire was formerly celebrated for its manufacture of stockings and knit caps, but that trade almost entirely disappeared soon after the establishment of the iron works in the reign of queen Elizabeth. Since that period the iron business, though in different degrees at different times, has constituted the chief employment of the manufacturing classes in the county. This branch of trade has of late years increased to a prodigious extent, so that Monmouthshire will, in all probability, soon take the precedence, as an iron district, of every other county in Great Britain.

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At Pontypool and at Usk there are still considerable manufactories of japanned goods, generally distinguished by the name of Pontypool ware, because first invented in that town, but this trade has suffered much from the competition of Birmingham, joined to the unfavourable state of our foreign relations. The commerce of Monmouthshire, which is very considerable, is almost entirely confined to the towns of Chepstow and Usk: under these respective names the reader will find the different articles of export mentioned. See Newport and Usk.

Monmouthshire, to the antiquary, is particularly interesting: Caerwent was first the capital of the Silurian dominions, and afterwards a Roman station. The other stations of that people in this district were Isea-Silurum at Caerleon, Gabannum at Abergavenny, Burrium at Usk, and Blestium at Monmouth; but some antiquaries place the two last at Oldcastle and at Caerphilly. To trace the direction of the Roman roads, particularly of the Julia Strata, in their passage through this country, is a subject of much difficulty. This has arisen chiefly from the disagreement of antiquaries with respect to the point at which the legionary troops usually crossed the Severn, which some have fixed at Amesbury, and others at Oldbury, Aull, New Passage, Hebury, and Portishead. The Julia Strata is most distinctly visible in the vicinity of Caerwent, running in the direction of Penhow. A few traces of it can likewise be discovered near Caerleon and Newport, but its course between these towns is wholly uncertain. Mr. Evans, however, conjectured that it proceeded along the right bank of the Usk, leaving Malpas church on the west, and Crindahouse on the east, and passed to the site of St. Woolo's church, on the hill north of Newport, where is a large encampment, and a tumulus, now nearly destroyed, which Mr. Harris regarded as an *arx speculatoria*. Of the roads which struck off from the Julia Strata, one led from Isea-Silurum to Burrium, where dividing into two ramifications, one proceeded to Gobannium and the other to Blestium. Another has evidently run in a south-westward direction, from Abergavenny to Neath, or to some station in Gloucestershire. This road is called by the natives *Sarn-bir*, or the long paved causeway, and in the neighbourhood of Bydewelly still remains almost entire. Besides these, various other marks of Roman civilization have been discovered in this county at different periods, consisting of aqueducts, baths, tessellated pavements, columns, statues, bas-relievs, sudatories, hypocausts, altars, votive and sepulchral stones, sarcophagi, urns, medals, coins, fibulae, &c. Numerous encampments of different forms and sizes are likewise distributed over this county, some of them no doubt originally British, and afterwards altered by the Romans, Saxons, or Danes, and others of them originally Roman, and altered in the same way by the warriors of a later period. A few seem to be Saxon or Danish entirely. Castles and other places of more permanent defence, are no less frequent here than encampments. Several of these have claims to very high antiquity, but the precise period of their erection is unknown. The most distinguished among them are the castles of Caerleon, Usk, and Scenfreth, which are said to be of British origin. The rest are no doubt of a much later date, and most probably not earlier than the period of the Norman conquest. Some of the churches in this county are very ancient, as appears from the style of their architecture, the circular arch, and the crenellated and billeted moulding for which they are so conspicuous, being characteristic of the Saxon and early Norman eras. The custom of whitewashing these edifices is unhap-

pily too much practised here, and destroys the venerable appearance which they would otherwise display. The disgusting and highly injurious practice of burying in churches is likewise extremely prevalent in Monmouthshire.

In concluding this article, it may be remarked, that though Monmouthshire is an English county, the inhabitants more generally speak the Welsh than the English language, particularly in the north-western and south-western districts. Their manners and customs bear a very strong resemblance in every respect to those of the principality. They display the same antipathy to the language and manners of the English, and an attachment to their own ancient practices. Catholics are very numerous in this county, and not only they, but the Protestants also, retain many vestiges of Romish superstition. Thus the custom of begging bread for the souls of the departed, still continues to be practised, on All-Souls' day, among the lower orders. A very interesting and satisfactory account of the antiquities, scenery, &c. of this county, will be found in Cox's "Historical Tour in Monmouthshire," 4to.

MONNEROU, a small island in the channel of Tartary, between the island of Saghalien, and the continent. N. lat. 46° 20'. E. long. 142° 21'.

MONNIER, PETER LE, in *Biography*, an eminent professor of philosophy, was born at Vire, in Normandy, about the year 1685. By his talents he became professor in the college of Harcourt, at Paris, and was elected a member of the Royal Academy of Sciences. He died Nov. 27, 1767. He was author of "Cursus Philosophicus," in six volumes 12mo, which was made a text-book in many of the French colleges. Monnier contributed also a variety of papers, that form a part of the "Memoirs" of the academy of which he was a member. He left behind him two sons, inheritors of his abilities, and both of them admitted to seats in the Academy of Sciences, of whom the eldest is the subject of the following article; the youngest, Lewis William, was made physician to the king at St. Germain-en Laye. Du Fresnoy.

MONNIER, PETER-CHARLES LE, a celebrated French astronomer, was born at Paris in 1715. From a very early period of his life he devoted himself to the study of astronomy, and is said to have made very accurate observations when he was only sixteen years old. At the age of twenty he had the high honour of being nominated a member of the Royal Academy of Sciences at Paris. At this period he accompanied Maupertuis in his expedition to Lapland for the purpose of measuring a degree of latitude. In 1748 he went to Scotland, to join lord Macclesfield in observing an annular eclipse of the sun, and he was the first astronomer who had the satisfaction to measure the diameter of the moon on the sun's disk. The king of France, Lewis XV., was much attached to astronomy, and patronized those who successfully pursued that science; and it is said he not only respected, but honoured and even loved Le Monnier. "I have seen the king," says Lalande, "come out of his cabinet, and look around for Le Monnier, and when his younger brother was presented to him, on his appointment to the office of first physician, his majesty was pleased to wish him the merit and reputation of his brother the astronomer." Monnier was always with the king when he observed the remarkable celestial phenomena. Thus they were together to witness the two transits of Venus, in the year 1761 and 1769. While these important observations were making, at which the celebrated La Condamine was present, the king was particularly careful not to disturb, by the smallest motion, the astronomers in their occupation. It is so de-

scribed by the astronomer himself, in his dissertation on the subject; "His majesty," says he, "perceiving that we judged the last contacts to be of the greatest importance, a most profound silence, at that moment, reigned around us." In the year 1750, Le Monnier was directed to draw a meridian-line at the royal chateau of Bellevue, where the king was accustomed to make his observations. On this occasion Lewis presented him with fifteen thousand livres, which the astronomer expended in instruments, with which he afterwards made his best and most important observations. The king had already presented him with a beautiful house at Paris, where he resided till the revolution, and pursued his astronomical labours. Le Monnier was incessant in his application to his favourite science, and apparently unwearied in those observations which tended to perfect it. Le Monnier was the preceptor of Lalande, and was worthy of such a scholar, as the scholar was of his instructor. Le Monnier forefaw in young Lalande, when he was but sixteen years old, the acute, learned, and indefatigable astronomer. When Lalande was sent to Berlin in 1742, to make observations for the purpose of determining the parallaxes of the moon, Le Monnier lent him his five feet mural quadrant. Le Monnier died at Lizieux, in Normandy, on the second of April 1799, at the advanced age of eighty-four years. He was ardent in his friendships, but his hatred was implacable. Lalande once displeased him, and he could never after regain his favour, but his pupil's gratitude and respect for him were always the same, and were, on every occasion, publicly declared. In 1797, Lalande wrote an eulogium on Le Monnier for the "Connoissance des Temps," in the language of gratitude, resulting from sentiments of profound veneration and esteem for the venerable astronomer, but Le Monnier refused to read it. This great man left behind him a number of valuable MSS. with some good observations. He had by him a series of lunar observations, and a multitude of observations of the stars, which he had announced as early as the year 1741, but he refused to publish them, nor could the most earnest entreaties of those whom he most esteemed, lead him to alter his intentions. Annual Register 1799. See LE MONNIER.

MONNIERIA, in *Botany*, so named by Læfſing and Linnæus, in honour of M. le Monnier, first physician to the French king Louis XV., who accompanied Cassini through the southern provinces of France, in the summer of 1739, and subjoined an account of their natural history, particularly their more curious plants, to the geometrical remarks of that astronomer. M. le Monnier was greatly instrumental in promoting the introduction of hardy exotics into France. He had a choice garden at Versailles, where the writer of this visited him in 1786, and a very extensive and valuable herbarium. Of the time of his death we have no information. Another genus had been previously dedicated to this able botanist, by Bernard de Jussieu; but this was reduced by Linnæus, and subsequent writers, to *Gratiola*. Mr. R. Brown has however re-established it, under the appellation of *HERPESTIS*; see that article, and *GRATIOLA*.—Læfſ. It. 197. Linn. Gen. 363. Schreb. 480. Willd. Sp. Pl. v. 3. 856. Mart. Mill. Dict. v. 3. Juss. 421. Lamarck Dict. v. 4. 261. Illustr. t. 596.—Class and order, *Diadelphia Pentandria*. Nat. Ord. uncertain; suspected by Jussieu and Lamarck to be near the *Borraginææ*, (*Asperifolia* of Linnæus,) or possibly akin to *Spigelia*. We perceive strong indications of the *Euphorbiæ* in some of its characters, however discordant others may appear.

Gen. Ch. *Cal.* Perianth inferior, in five deep, unequal, permanent segments; the upper one longest, linear, incurved

over the flower; the lateral one on the outer side lanceolate, half as long, the rest still shorter and obtuse. *Cor.* of one petal, shorter than the upper segment of the calyx, ringent; tube cylindrical, narrowest in the middle, curved; upper lip ovate, obtuse, undivided; lower in four equal, parallel, straight, oblong, obtuse, deep segments. Nectary an ovate scale, at the base of the germen, within the lower filament. *Stam.* Filaments two, dilated, membranous; the uppermost concave, cloven at the extremity; the lowermost flat, three-cleft; anthers on the upper filament two, combined, hairy within, embracing the stigma; on the lower three, very minute, cylindrical, probably sterile. *Pist.* Germen superior, roundish, five-angled, five-lobed; style solitary, thread-shaped; stigma capitate, oblong, flattened within, orbicular, sharp-edged. *Peric.* Capsules five, ovate, short, compressed, of one cell, divided half way down into two valves. *Seeds* solitary, ovate, tubercular, filling the capsule, straighter and blunter at their inner margin, each enclosed in a tunic, of two smooth elastic valves.

1. *M. trifolia*. Linn. Sp. Pl. 986. Aubl. Guian. v. 2. 730. t. 293.—Gathered by Læfſing at Cumana in South America; by Aublet in the meadows and cultivated land of Cayenne and Guiana. A specimen, sent by Mr. Alex. Anderson, from the Dutch settlements in the last-mentioned country, was given us by sir Joseph Banks, there being none in the Linæan herbarium. The *root* is annual and fibrous. *Stem* about a foot high, repeatedly forked, leafy, round; the upper part rough with minute hairs, curved upward. *Leaves* ternate, on hairy stalks, the lower ones opposite, the rest usually alternate; leaflets nearly equal, above an inch long, ovate, entire, pale green, hairy, especially the edges and ribs, thickly besprinkled on both sides with small resinous dots; the middle one slightly stalked. *Flowers* in terminal, solitary, cloven, divaricated, simple clusters, rather than spikes, with a solitary flower between, at the base. *Calyx* hairy. *Corolla* white. The *leaves*, though they have been dried 20 years, retain an acrid or burning flavour, without any fragrancý.—The natural affinity of this rare plant has puzzled the greatest botanists. We venture to hunt its relationship to the *Euphorbiæ*, rather as a conjecture than otherwise. The *capsules* are pale, dotted like the leaves. *Seeds* dark grey, almost black, rough with prominent points. S.

MONNOYE, BERNARD DE LA, in *Biography*, was born at Dijon in the year 1641. He was brought up to the bar, but his taste and eagerness for polite literature gave him disgust for legal pursuits. He contented himself therefore with a very trifling office, the duties of which gave him an opportunity to employ much time in his favourite studies. He acquired an accurate knowledge of the Greek, Latin, Spanish, and Italian languages, and attained considerable excellence in the composition of French poetry. In 1671, he obtained a prize of the French academy for a poem entitled "Le Duel aboli." Several of his other pieces, written in praise of Lewis XIV., obtained similar honours. He was free from ambition, and notwithstanding the celebrity which he had acquired, he preferred living in his native province to a residence in the capital. He passed his time in an easy state of independence, till the fatal system of Law reduced him, with thousands, to absolute poverty. (See LAW.) In this situation his merit was not overlooked; his distress was alleviated by a pension from the duke of Villeroi, and he lived to the advanced age of eighty-eight. He was extremely conversant with literature in all its branches, and was accounted the oracle of bibliographers of his time. The works by which he is principally known are "Poesies Francoises,"

coises," and "Nouvelles Poésies," which consist of miscellaneous pieces of different degrees of merit. There are annexed to them Latin poems and small pieces which may be ranked with fables, epigrams, and tales, written with elegance and true classical simplicity, but many of them have a licentious tendency. The Latin poems were also published by the abbé d'Olivet, together with those of Huet, Massin, and Fraugier; "Noels Bourguignons," a set of Christmas carols in the Burgundian dialect, much applauded for their humour, but on account of the grossness of some of them, they were condemned by the Sorbonne. Monnoye was author also of "Remarques sur le Menajiana avec une Dissertation sur le Livre De tribus Impostoribus;" "Remarques sur les Bibliothèques de du Verdier et de la Croix-du-Maine." He was editor of "Recueil des Pièces choisies." His own works have been printed in three vols. 8vo. Moreri.

MONOCASY, in *Geography*, a river of America, in Maryland, which, after a S.S.W. course, discharges itself into the Patowmè, about 50 miles above Georgetown.

MONOCEROS, **UNICORN**, in *Astronomy*, a southern constellation formed by Hevelius, containing in his catalogue, nineteen stars, and in the *Britannic Catalogue* thirty-one. See **CONSTELLATION**.

MONOCEROS, in *Ichthyology*, a species of *monodon*; which see.—Also, a species of *Balistes*, with the fin of the head uniradiated, and the caudal rays carinated. This is the *Balistes unicornu* of Bloch, with 51 rays in the anal fin, the *Caprifiscus longus*. &c. of Klein, and the *Acaramucn* of Marcgrave and Willoughby. There is a variety of this, or a distinct genus of *Balistes*, denominated *Scriptus β*, the unicorn fish of Bahama, described in Catesby's *Carolina*. It is found in the sea that washes the coasts of Asia and South America; its colour is varied with cinereous and brown; the first is somewhat more than a foot in length; the second is three feet long; they feed on young crocodiles, and the latter is held to be poisonous.

MONOCEROS, a name which has been given to several animals, among which are, the *unicorn*, generally supposed to be a fabulous animal, but the existence of which, in the interior of Africa, is insisted upon by several writers. A Mahometan African prince is said to have sent two of them to Mecca in the year 1799; an insect called *Meloë monoceros* by Linnæus, and *Noctoxus monoceros* by Fabricius. See the preceding article.

MONOCHORD, a musical instrument with which to try the variety and proportion of musical sounds.

The monochord, according to Boethius, is an instrument invented by Pythagoras, for measuring geometrically, or by lines, the quantities and proportions of sounds.

The ancient monochord was composed of a rule divided and subdivided into divers parts, on which there was a string pretty well stretched upon two bridges, at each extremity. In the middle between both was a moveable bridge, called *magas*, by means of which, in applying it to the different divisions of the line, the sounds were found to be in the same proportion to one another, as the divisions of the line cut by the bridge were.

The monochord is also called the *harmonical canon*, or *canonical rule*; because serving to measure the degrees of gravity, and acuteness of sounds. Ptolemy examines his harmonical intervals by the monochord.

There are also monochords with divers strings, and a multitude of fixed bridges; but the use of all these may be supplied by one single moveable bridge; by only shifting it under a new chord or string, which is placed in the middle, and re-

presents the entire sound, or open note, answering to all the divisions on the other bridges.

When the chord was divided into equal parts, so that the terms were as 1 and 1, they called them unisons; if they were as 2 to 1, octaves, or diapasons; when they were as 8 to 2, fifths, or diapentes; if they were as 4 to 3, they called them fourths, or diatessarons; if the terms were as 5 to 4, diton, or a greater third; if as 6 to 5, demi-diton, or a lesser third; lastly, if as 24 to 25, demi-diton, or diesis.

The monochord, being thus divided, was probably what they call a system, of which there were many kinds, according to the different divisions of the monochord.

Dr Wallis has taught the division of the monochord in the *Philosophical Transactions*; but that instrument is now disused, the modern music not requiring such division.

Censorinus informs us that Apollo found the monochord in the sound of the string of his sister Diana's bow; and it seems at least probable, that the first stringed instrument was a monochord, and that that single string was the string of a bow.

Aristides Quintilianus says that the monochord was recommended by Pythagoras on his death-bed as the musical investigator, the criterion of truth. It appears to have been in constant use among the ancients, as the only means of forming the ear to the accurate perception, and the voice to the true intonation of those minute and difficult intervals which were then practised in melody.

MONOCHORD, *Μονοχορδον*, formed of *μονος*, *solus*, *single*, and *χορδον*, *chord*, is also used for any musical instrument, consisting of only one chord or string.

The monochord, called also the *vielle*, and vulgarly the *burdy-gurdy*, has frets which are raised by the action of the fingers on a row of keys; and instead of a bow, the string is made to vibrate by the motion of a wooden wheel: there is also a second string serving as a drone, producing always the same sound: this is furnished with a bridge loosely fixed, which strikes continually against the sounding board, and produces a peculiar nasal effect. The trumpet marine, or trumpet Marigni, was a string of the same kind, which was lightly touched at proper points, so as to produce harmonic notes only: it was impelled by a bow. The Æolian harp is also an instrument, which, when agitated by the wind, affords a very smooth and delicate tone, frequently changing from one to another of the harmonics of the string, according as the force of the wind varies, and as it acts more or less unequally on different parts of the string. See **ÆOLUS'S Harp**.

MONOCHROMA, *Μονοχρωμα*, compounded of *μονος*, *single*, and *χρωμα*, *colour*, a picture all of one colour.

MONOCOLI, *Μονοκολοι*, a kind of fabulous men, who, as the Arabians give out, inhabit the country of Segir, in Arabia Felix; and are but half formed.

The word is Greek, compounded of *μονος*, *one*, and *κολον*, *a member*.

MONOCOTYLEDONES, in *Botany*, from *μονος*, *one*, and *κοτυληδων*, *a cotyledon*, or *feminal leaf*, one of three great tribes or assemblages of plants, into which the whole vegetable kingdom is divided, by botanists who study a natural system of arrangement, the other two being the **ACOTYLEDONES** and **DICOTYLEDONES**; see those articles, especially the latter. Some plants indeed have been esteemed polycotyledonous, as Flax, and the Fir tribe. But these are so very few, and agree so perfectly in their nature and physiology with the *Dicotyledones*, that they are best comprehended under the same

same denomination. The only vegetables for which we should be disposed to establish a class of *Polycotyledones*, are the Ferns and Mosses, hitherto referred, by Jussieu and his followers, to the *Acotyledones*, but physiologists are not agreed on the subject of the germination of these plants. (See *FILICES* and *MUSCI*). A still greater difficulty exists as to a distinction between the *Monocotyledones* and the *Acotyledones*, to which we have already sufficiently adverted; see *COTYLEDONES* and *GERMINATION*. We shall therefore here consider those two supposed families as but one, for which the denomination of *Acotyledones* would be the most proper of the two, the other term having originated in an old opinion, that what is now known to be the *albumen* of the plants in question, (and was observed in palms and grasses, which make a part of the number,) was really a simple cotyledon.

But although we consider the above two families as but one, as far as concerns the presence, or rather absence, of a cotyledon, we mean not to say the *Fungi*, *Algae*, and *Hepaticæ*, which make the first three orders of Jussieu's *Acotyledones*, have any considerable affinity to those of his orders which he refers to *Monocotyledones*. On the contrary, they are, as well as the *Filices* and *Musci*, his 4th and 5th orders, so very distinct, that no system which combines them all together can be called natural. As to his remaining order of *Acotyledones*, the *Naiades*, they are too heterogeneous for us to decide upon with any certainty; but their natural affinity to the *Monocotyledones* of Jussieu, and their dissimilitude to his *Acotyledones*, are equally obvious. In the following remarks therefore we wish to be understood as speaking of those natural orders which the great French botanist comprehends under his division of *Monocotyledones*, though we consider them as not having properly any cotyledon at all. There are sixteen in number, *Aroideæ*, *Typhæ*, *Cyperoideæ*, *Gramineæ*, *Palmeæ*, *Asparagi*, *Junci*, *Lilia*, *Bromeliæ*, *Aphodeli*, *Narcissi*, *Iridæ*, *Musæ*, *Canna*, *Orchideæ*, and *Hydrocharidæ*. Under the last however Jussieu, by mistake, comprehends some dicotyledonous plants.

The plants in question are remarkable for a great simplicity or plainness of structure. Their leaves are for the most part alternate, simple, with simple parallel ribs. The number three prevails in the parts of fructification instead of five, which belongs to the *dicotyledones*. Their germination is lateral; their interior substance peculiarly soft and cellular. It is a favourite hypothesis of Jussieu that these flowers have no corolla, the gorgeous integument of the liliaceous plants being considered by him as a coloured calyx. His arguments in support of this opinion only prove the great simplicity, and want of decided distinction, in their several parts. Thus, the petal of a tulip is alike liable to become half leaf, or half stamen. The outside of petals of lilies, however richly they may be adorned within, in many instances approaches to the colour and texture of a calyx; while in *Pancreatium* and *Narcissus*, there is a superabundance, or doubling as it were, of the more delicate part of the flower, so that these genera, far from wanting a corolla, appear to have two.

The internal structure of the *Monocotyledones*, as explained by the learned Desfontaines and Mirbel, is extremely peculiar, and differs very essentially from that of other plants. They have no proper bark and wood, augmented gradually by concentric layers. (See *CORTEX*, and *CIRCULATION of the Sap*). Their cuticle indeed is like that of the *Dicotyledones*, generally speaking; except that in some it abounds with a starchy secretion, in no small quantity, nor is that secretion always confined to the cuticle; witness the order of

grasses. Their woody substance is deposited round their numerous longitudinal tubes, as so many centres, such tubes uniting here and there, composing a sort of network, which gives firmness and tenacity to the body of the plant. Indeed the deposition of wood, though not in concentric layers, is regular, according to some determinate arrangement in each family, and in several acquires a great degree of density and hardness. The peculiar secretions of this tribe are very frequently of a saccharine nature; and scarcely ever of a mucilaginous, never, we believe, of a resinous kind. In their constitutions, some of them are very tender with regard to cold, others, in every respect nearly, the most hardy of plants; all are generally of rather rapid growth, though some very long-lived. Their roots are very generally perennial, to which there is scarcely an exception, besides what occur in the natural order of grasses. In consideration of the order last mentioned, the *Monocotyledones* deserve to be considered as the most important of all plants for the support of mankind.

MONOCULUS, in *Entomology*, a genus of insects of the order Aptera, of which the generic character is as follows: legs from four to eight, formed for swimming, and very long; body covered with a crust or shell divided into segments; some have four, some two antennæ, and some are without any; it has *one* or *two* eyes, notwithstanding its name *monoculus*; when there are two eyes they approximate and are fixed in the shell; there are four feelers, in continual motion when swimming; the hind ones are very small, and hook-shaped.

There are sixty-eight species, separated into eight divisions, named according to the first eight letters in the alphabet. These are found chiefly in Europe, a few in India, commonly in muddy ditches, frequently in sea-waters, often parasitic on fuci, conservæ, ulvæ, and other aquatic plants. Many inhabit our own ditches or sea-coasts.

Of all the monocoli by far the greater part are very small water insects, requiring the assistance of the microscope for the investigation of their particular organs; some, however, as we shall see, are so large as to require no very minute inspection, and one species is of a size so gigantic that it is generally considered as the largest of the whole crustaceous tribe. This is the polyphemus, and will be found in the division G.

The insects in division A have a single eye and crustaceous body.

Species.

OCULUS. In this species there are no antennæ, but two feelers, which are long and branched; the tail is inflected. The insects of this species are found in the pools and stagnant waters in many parts of Europe; they swim in swarms upon their back; each insect has a large black eye, which appears to occupy the whole of the head.

* **QUADRICORNIS**. The antennæ in this species are four; the tail is straight and bifid, the divisions are branched. It is described in Donovan's English Insects. It is found in different parts of Europe, and in the stagnant waters of this country. The body is sometimes greyish or greenish, smooth or covered with hair; it has eight legs that are hairy; the female possesses an oval bag, containing the eggs on each side the tail. This is a very minute insect, it derives its specific name from its four horns, and is well known, being very common in almost every stagnant water, and sometimes makes its appearance in that of pumps and wells, and is accordingly observable frequently in water brought to table.

MONOCULUS.

Its size is not greatly superior to that of the common mite.

MISURUS. Here the antennæ are two and linear; the tail ending in two bristles. This insect is found at the banks of ditches, generally among duck-weed, and at first sight is thought to resemble the *Lepisma saccharina*. The number of legs is ten, which are long and hairy; the tail ends in two papillæ.

CARULUS. Antennæ two, linear; body bluish, with a straight two-lobed tail. It inhabits Germany in muddy ditches. The head, the tail, and antennæ are red; the eyes black; abdomen green; legs eight.

* **RIBENS.** Antennæ two, linear; body reddish, with a straight forked tail. Found in ditches and rivulets, and is common through the whole year; it has eight legs.

VACINULATUS. In this the antennæ are two, linear and white; tail curved forked. It inhabits Germany, in ditches.

LONGICORNIS. Antennæ two, linear and very long; tail bifid. It inhabits the sea round Finmark. The tail ends in two bristles.

CAPTIVUS. Antennæ two, linear; head covered with a dilated shield; tail straight cleft. This is found in Germany. It has six legs; and the tail has six joints.

MINUTICORNIS. In this the antennæ are two, short and linear; the tail is cleft and ending in two bristles. It is sometimes though not often found in sea-water. The feelers are about half as long as the antennæ.

CLAVIGER. The antennæ two, subclavate, rigid; tail bifid. It inhabits, though very rarely, the rivers of Germany, and glides slowly along, alternately on its back, sides, and belly, and sometimes it will raise itself upright. The body above is white, and red beneath; the tail is without joints, and the legs are eight.

CRASSICORNIS. The antennæ two, dilated and short; tail bicuspitate. Sometimes found in marshy places. The body is in five segments; the antennæ branched at the base.

CURVICORNIS. Antennæ two, which are minute and straight, with three hairs at the tip; the body is inarticulate; the hands unarmed; the tail forked.

CHELIFER. Antennæ two, short and recurved; body inarticulate; hands chelate; tail forked. Found in sea-water.

BREVICORNIS. Antennæ two, those of the male hooked; the tail is set with very short bristles. It inhabits sea-marshes, and resembles the quadricornis. The antennæ of the female are forked at the tip.

The insects in division B have a single eye and bivalve shell; the antennæ are branched.

Species.

* **PULEX.** Tail inflected; shell mucronate behind. This insect derives its specific name, *pulex* or *water-flea*, on account of its peculiar starting or springing motion; it is almost an universal inhabitant of stagnant waters, appearing sometimes in such vast swarms as to cause an apparent discolouration of the water. It is an insect of a highly singular and elegant appearance, exhibiting, when magnified, a beautiful distribution of internal organs. It is generally about $\frac{1}{16}$ th of an inch in length, but sometimes considerably larger. It is of an oval shape, somewhat truncated in front, and sharply pointed behind; the body is inclosed in a bivalve transparent shell, which, when examined by the microscope, appears finely reticulated. The eyes of these animals are of a sin-

gular construction, they are large in proportion to the insect, and placed very near each other, and appear to consist of many separate globules of a black colour, united under a common film. In the female insect the ovarium is generally very conspicuous, filling the greater part of the space between the shells; the ova are very large in proportion to the size of the animal, and the young are hatched before their exclusion from the parent. This animal is said to possess, in an inferior degree, the surprising property of the genus *aphis*, viz. that of producing a series of already impregnated descendants.

LONGISPINUS. Tail inflected; shell ferrulate before and prickly behind. Found in fresh water. The shell is ovate, white, and pellucid, ending behind in a strong spine ferrate each side, and half as long as the shell; it has eight legs.

QUADRANGULA. The tail is inflected; shell quadrangular unarmed. Found in stagnant pools; the body is sometimes red, and it has six legs.

SIMUS. Tail inflected; shell oval unarmed; found in marshes; the shell is pellucid and yellowish.

RECTIROSTRIS. Tail inflected; hind head with two projecting horns: inhabits marshes. The shell is oval pellucid, with gaping valves, and ciliate on the fore-margin; the tail two long bristles; legs six to eight.

CURVIROSTRIS. Tail inflected; the front has two inflected horns. It is found in pools; the shell is hairy on the fore-margins; front has two pendent horns; the tail ends in two hooks; it has eight legs.

* **MUCRONATUS.** Tail inflected; shell ovate, beneath inflected, and prickly behind. It is found in marshes. Swims on its back on the surface of the water. The shell has four black dorsal streaks; it has twelve legs.

CRYSTALLINUS. Tail inflected; oblong crystalline; head with two short horns at the tip. Found in fresh water. The body is white pellucid, with twelve hairy legs.

PEDICULUS. The tail of this species is inflected. It inhabits fresh water.

SETIFER. The tail is straight; shells with long tufts of hair at the angles of the valves. It inhabits stagnant pools. The shell is oblong, pellucid, and crystalline; the antennæ have three branches; the legs, which are eight or more, are very hairy; and the tail is divided at tip.

The insects in division C have a single eye and bivalve shell; the antennæ are simple.

Species.

VIRIDIS. Shell ovate, downy, green; the fore-legs falcate, and ferrate within. It is found in sea-water on fuci and conservæ.

* **LUTEUS.** Shell ovate, gibbous, glabrous, pale yellow. Found on fuci.

* **FLAVIDUS.** Shell oblong, glabrous, pale yellow. It is found frequently on the *Fluitra lineata*. The shell is pellucid; fore-legs round.

GIBBOSUS. Shell ovate, hispid, and gibbous each side. Found on ulvæ. The shell is ovate, pale, and bristly.

COARCTATUS. Shell ovate, glabrous, and contracted in the middle. It inhabits fuci. The shell is of a greenish hue, with a black eye.

The insects in division D have a single eye and bivalve shell; antennæ tufted at the tip.

Species.

DETECTUS. Shell oblong, white, pellucid; tail with two

MONOCULUS.

two bristles. Inhabits ditches. It has four legs, the fore ones are recurved; hind-ones reflected.

STRIGATUS. Shell kidney-shaped, brown, with three white bands. Found in muddy ruts. The shell is glabrous; the antennæ have eleven bristles.

ORNATUS. The shell of this species is ovate, situate beneath, on the fore-part, and variegated with white, green, and fulvous.

PILOSUS. The shell is ovate, brown, ciliate before and behind. This species is found in the nectaries of the *Utricularia minor*. The shell is smooth, glabrous, and opaque.

CANDIDUS. Shell ovate, snow-white, immaculate. It is found in marshes. Shell obtuse before and behind.

LÆVIS. Shell ovate, glabrous, greenish. Inhabits ditches. The shell is obtuse and opaque; tail ending in a spine.

VIDUA. Shell ovate, white, with three black bands. Found in muddy water. In this species two of the bands are in the middle, and one on the fore-margin. The valves are gibbous and whitish.

TELEMUS. Shell sub-globular, three-toothed behind with a truncate lip on the fore-part. It is found at Algira, and is pellucid. Some naturalists imagine that it does not belong to this genus.

LENTICULARIS. Shell compressed and lentiform. Found in Finland.

* **CONCHACEUS.** Shell ovate, downy. Found in stagnant water. This is an English insect, and has been described and figured by Mr. Donovan. The body is green, opaque, with yellowish legs; its abdomen nearly two-lobed, and fulvous, with a black circle in the middle: it contracts itself within the shell, and swims on the belly.

FASCIATUS. The shell is oblong, whitish, with a green band. Found in stagnant water, and resembles a grain of barley. The green band is placed in the middle behind the eye.

MONACHUS. Shell glabrous, yellow, edged with black; the shell is opaque, truncate before, and rounded behind.

CRASSUS. Shell oblong, gibbous, yellowish, with an oblique, abbreviated, fulvous band. It inhabits fenny places.

Insects in division E with a single eye and univalve shells, and two antennæ.

* **SATYRUS.** Shell ovate, pellucid, and emarginate behind; antennæ obtuse. This species is noticed by Baker and Adams on the microscope. The shell is flat and membranaceous; fore-legs with a double shank; tail truncate, and cleft in the middle.

SILENUS. Shell is ovate, opaque, and sub-marginate behind; last joint of the antennæ subulate. It is found in ditches filled with the leaves of trees. The shell is sometimes yellowish.

MÆNUS. Shell oval; antennæ horizontally extended; body truncate at the base. Inhabits sea-water. Swims on its back; shell with a convex fulvous back.

FAUNUS. Shell ovate, pellucid, and emarginate behind; last joint of the antennæ subulate. Found in ditches among duck-weed. Shell gibbous; antennæ bent back.

BACCHUS. The shell is ovate, emarginate behind, and ending in two bristles. It inhabits rivers. The antennæ are stretched forwards.

THYAS. The shell of this species is dilated, linear; the antennæ are incumbent. Found in stinking sea-water. The fore-legs are branched.

BRACTEATUS. The shell is globular, and unarmed; it

has six legs. Is found in fresh water. The antennæ are obtuse; shell very pellucid.

* **SALTATORIUS.** Shell oval-oblong, and bristly behind. This is described by Baker and Adams. The shell is pellucid, and terminated by bristles.

Insects in division F have their shells univalve, and two eyes placed beneath.

CHARON. Shell pellucid, and four legs. Found in ditches. The eyes are spherical, remote, deep black, with four capillary circles round them.

* **DELPHINUS.** Shell gibbous; eight legs. Inhabits rivers. It is described by Baker on the microscope.

ARMIGER. This species has six legs.

Insects in division G have their shells bivalve; two eyes placed on the back.

Species.

POLYPHEMUS. Shell orbicular; the future lunate, and toothed behind; tail subulate, and very long. This species is commonly distinguished by the title of molucca, or king-crab. Specimens have sometimes been seen two feet in length, exclusive of the tail. It is a native of the Indian ocean, and is generally found in pairs. The colour of the whole animal is of a yellowish-brown; the shell is very convex, rounded in front, and lunated behind, where it joins the lower part of the body. The shell, which is of a crustaceous nature, is marked on each side into several spiny incisions. It has seven legs on each side, which are situated beneath the concavity of the large or round part of the shell, and are each terminated by a double claw; the branchiæ, or respiratory organs, are disposed in the form of several flat, rounded, imbricated lamellæ, on each side the lower part of the body; the tail, which is straight, triangular, and of the same crustaceous nature with the rest of the shell, is equal in length to the whole body, and gradually tapers to a sharp point. The eyes in this species are distant from each other, of a semi-lunar form, and the surface is divided into a great number of minute conical convexities: this part is, however, regarded as constituting the cornea, or exterior covering of the eye, the organs themselves being placed on a pedicle, beneath each of the semi-lunar corneæ. A writer in the *Philosophical Transactions*, speaking of this insect, says, "the eyes, instead of being approximated, as is required in the Linnæan generic character, are extremely distant from each other, being situated towards the sides of the shell. The whole structure of the animal is very remarkable, and particularly his eyes, which are between the fourth and last pair of claws on each side, reckoning from his mouth, and excluding the small pair there placed, are inserted the rudiments of another pair, or a claw broken off on each side, at the second joint or elbow: on these extremities are the eyes, like those of the horns of snails, but under the covert of a thick and opaque shell, nature in that place hath wonderfully contrived a transparent lantern, through which the light is conveyed.

CYCLOPS. Shell convex, with three lines of raised spines; tail very long, and unarmed. It is about one-third the size of the polyphemus, and is found in India. Shell lunate before, with three raised dorsal lines, and two acute teeth, finely serrate behind, with a raised line in the middle, in which are three teeth.

* **APUS.** Shell oblong, truncate, and serrate behind; tail ending in two bristles. It is found in stagnant water. This is the largest of the European monoculi. It is a rare species in this country, having been only observed in a few particular situations. In its general shape it is considerably allied

allied to the large exotic species above-described, but the form of the body is more lengthened. The branchiæ, or respiratory organs, are large, and distributed into numerous imbricated rows on the under part of the body; beneath the front is a pair of jointed trisid arms, extending on each side to a considerable distance; the eyes are placed near each other in front of the shell; the tail is terminated by a pair of long forks, or setaceous processes; the colour of the whole insect is of a pale greenish-brown above, and reddish beneath. An account has been given in the 40th vol. of the Phil. Trans. that this species has been seen in numbers in a pond at Bexley, in Kent. It is also added, that the same pond, having been perfectly dried, and being suddenly filled, during a heavy thunder-storm, swarms of the same animals were again observed in it within the space of forty-eight hours after.

* **PISCINUS.** Shell heart-shaped and flat; body short; tail bifid, and composed of one thin flap. It is a native of European seas. Found on flounders, cod-fish, salmon, &c. adhering on the outside between the scales, running swiftly, with its tail elevated, both on the fish and on the water. Shell pellucid, with yellowish marks; abdomen very short, with a long bifid tail.

PENNIGERUS. Shell hemispherical, with a linear future; tail feathered. Inhabits fresh water.

SALMONEUS. Shell oblong; tail imbricate, and four-leaved. It is found, as its name denotes, sticking to the salmon, between the scales.

Insects of division H have bivalve shells, two eyes, and capillary antennæ.

Species.

BRACHYURUS. Shell globular; tail deflected; four antennæ. It is found in marshes. The shell is pellucid, reddish-brown when young, and green as it grows older, with a white eye on the fore-part, and a black one behind; legs are twenty to twenty-four.

* **SPHERICUS.** Shell globular; tail inflected; two antennæ. This species is found among the duck-weed in stagnant water. It is a native of Europe, and found frequently in this country. It is very minute; the shell is reddish; it has two antennæ; twelve legs; and the tail is furnished with a small hook at the extremity, and concave beneath; the ovaria are green.

QUADRANGULARIS. Shell quadrangular, hence its specific name; tail inflected; antennæ two; legs in number are from twelve to sixteen, besides numerous smaller ones; the tail is armed with two minute spines at the tip.

LAMELLATUS. Shell ventricose; tail inflected lamellate; antennæ two. Found in stagnant water. The shell is convex; eyes are green; legs capillary; the tail has a broad ferrate lamina beneath, and two spines at the tip.

TRIGONELLUS. Shell gibbous before; tail inflected, ferrate; four antennæ. Found in ditches. The shell is ciliate, with a sharp proboscis; antennæ with three bristles at the tip; ovaries black.

TRUNCATUS. Shell ovate, and toothed behind; tail inflected, ferrate; four antennæ. Inhabits stagnant waters. Shell oblique, striated, ciliate before, and ferrate behind; the tail is broadish, and ending in a claw.

LONGIROSTRIS. Shell roundish; tail inflected; shell prickly on the fore-part. It inhabits rivulets. The proboscis is longer than the head, curved, and subulate.

MACHOURUS. Shell oblong; tail straight; antennæ four. It is found in lakes. The shell is pellucid, whitish; legs eight; nail lanceolate.

SOON. Shell ovate; tail projecting, curved; antennæ two. Found in almost all kinds of waters. The shell is pellucid, without stria, teeth, or fringe. It has four legs, and the tail is bicuspidate at the tip.

MONOCULUS, or *Monophthalmus*, (from $\mu\omicron\varsigma$, single, and *oculus*, or $\sigma\upsilon\mu\mu\alpha$, an eye,) a bandage in Surgery, formerly much more employed than at present. It consisted of a roller, ten or twelve feet in length, and about three inches in breadth. It was first fixed on the occiput, about a foot of the bandage being left hanging down. It was then carried obliquely round the head, over the forehead, to the occiput again. After being applied thrice round the head in this oblique direction, the remainder of the bandage was expended in more horizontal turns. The end, hanging down behind, was lastly brought over the vertex to the forehead, and the whole was secured with pins. The chief use of the monocusus was to retain dressings and application on diseases about the eye. The old surgeons had also a double monocusus; but it scarcely merits description, as it is now seldom or never made use of.

MONODON, in *Ichthyology*, a genus of fishes of the order Cete. The generic character is: two teeth in the upper jaw, extending straight forwards, long, spiral; spiracle on the fore and upper part of the head. Dr. Shaw has altered the generic character, by using the singular, *tooth* projecting, instead of *two teeth*, because though he admits there are sometimes two teeth, yet as the animal is generally found with one only, and because the generic name *monodon* is derived from that very circumstance, the alteration seems necessary. According to Gmelin there is but one species, *viz.* the *monoceros*, but Dr. Shaw mentions two species. We shall describe them both:

Species.

MONOCEROS, or *Narwal*, is a native of the northern seas, where it is sometimes seen of more than twenty feet in length from the mouth to the tail. It is at once distinguishable from every other kind of whale, by its very long, horn-like tooth, which is perfectly straight, of a white or yellowish-white colour, spirally wreathed throughout its whole length, and gradually tapers to a sharp point. It measures from six to nine or ten feet in length, and proceeds from a socket on one side of the upper jaw, having a large cavity at its base or root, running through the greater part of the whole length. In young ones, and sometimes in those that are full grown, there are two teeth, but in general the narwal is found with a single tooth, the socket of the other being closed, or at most but obscurely visible, and now and then the appearance of a second tooth in an extremely small state, or just beginning to emerge, is perceptible, as if intended by nature to supply the place of the other, if broken or cast. The head of the narwal is short, and convex above, the mouth is small; the spiracle or breathing-hole is duplicated within; the tongue is long; the pectoral fins are small. The general form of the animal is rather long than thick in proportion to its size. The colour, when young, is nearly black, but the belly is lighter. As, however, it advances in age, it becomes marbled, or variegated with black and white on the back and sides, while the belly is nearly white. The skin is smooth, and there is a considerable depth of oil or blubber beneath it. It is chiefly found in the northern parts of Davis's straits, and its food is supposed to consist of small flat fish, as well as of actiniaz, medusæ, and other marine animals. It is commonly seen in the small open or unfrozen spots towards the coasts of the northern seas. To such places the narwals resort in multitudes, for

the conveniency of breathing, and because they are sure to find, near the shores, a due supply of food: they are taken by means of harpoons, and the flesh is eaten by the Greenlanders, raw, boiled, and dried; the intestines and oil are also used as a food; the tendons make good thread, and the teeth serve the purpose of hunting horns, as well as that of building tents and houses. A throne made for the Danish monarchs is said to be still preserved in the castle of Rosenborg, composed entirely of narwals' teeth, which were formerly considered as more valuable than gold.

SPURIUS. This, if it be a distinct species of the monodon, has a pinnated back, and two small teeth in the upper jaw.

It is described by Fabricius, in his *Fauna Groenlandica*, as a species most allied to the narwal, but not perhaps, strictly speaking, of the same genus; it has no teeth in the mouth, but from the extremity of the upper mandible project two minute, conic, obtuse teeth, a little curved at the tips, weak, and not above an inch long; the body is elongated, cylindrical, black. Besides the pectoral fins and horizontal tail, there is also a minute dorsal fin. Its flesh and oil are considered as purgative; it is among the rarest of whales, and inhabits the main ocean, seldom coming to the shore. It has a spiracle like other whales. It is very seldom taken alive, but found dead on the shores.

MONODY, MONODIA, compounded of *μονος, solus*, and *ᾠδή, a song*, in the *Ancient Poetry*, a kind of mournful song or ditty, sung by a person alone, to utter his grief.

MONODY, in *Music*, a song for a single voice, in opposition to what the ancients called chorodies, or music executed by a chorus.

MONOECIA, in *Botany*, from *μονος, one*, and *οἶκος, a house*, the 21st class of the artificial system of Linnæus, consisting of such plants as have barren, or male, flowers on the same individual with fertile, or female, ones; whereas in the 22d class such flowers grow upon distinct individuals of the same species. (See **DIOECIA.**) How far these classes are natural or not, we have explained under that article.

The orders of *Monoechia* in Linnæus are eleven, distinguished upon the same principles as those of *Dioecia*. 1. *Monandria* is exemplified by *Aegopicon* and *Zannichellia*, permanently monoecious genera, as having a different structure in the accessory parts of their male and female flowers. 2. *Diandria* is scarcely tenable, one of its two genera, *Anguria*, having no such difference of structure, and the other, *Lemna*, having certainly the stamens and pistil in the same flower, except by accidental or partial imperfection. 3. *Triandria* contains *Carex*, *Sparganium*, &c., with some plants of the order of *Tricocca*, or *Euphorbia*, all properly placed here. 4. *Tetrandria* consists of the *Littorella*, *Betula*, *Buxus*, *Urtica* and others. 5. *Pentandria* embraces a remarkable tribe, closely allied, for the most part, to the Syngenesious, or compound, class; but their anthers are separate, and in some of them, as *Xanthium* and *Nepbelium*, the female flowers have no resemblance to that class, nor to their own males. 6. *Hexandria* consists chiefly of a very few grasses. 7. *Heptandria* depends only on *Guettarda*, much better placed in *Pentandria Monogynia*. (See **GUETTARDA** and **MATTHIOLA.**) 8. *Polyandria*, (having eight or more stamens,) is best illustrated by the important genera *Fagus*, *Quercus*, *Juglans*, &c. whose male flowers are, in most cases, amentaceous. 9. *Monadelphia* has the no less important genus *Pinus*, with some of the *Euphorbia*. 10. *Syngenesia* consists of the Gourd or Cucumber tribe; but it is difficult to account for their being placed here, their anthers being in no manner combined. On the contrary, their filaments are more or less united, inasmuch that Willdenow removes them to the 9th order, *Monadelphia*.

This does not seem correct with respect to any of the tribe; and in those we have examined the filaments are united, more or less completely, into three sets, so as strictly to constitute an order of *Monoechia Polyadelphia*, which should take place of this 10th Linnæan order. (See **MONORDICA.**) 11. *Gynandria*, composed of *Andrachne* and *Agyneia*, does not appear to exist in nature at all, these genera belonging more properly to the 9th order, *Monadelphia*, where some of their allies already find a place.

We cannot too often protest against the abolition of the monoecious and dioecious classes, whether we consider them in the light of natural or commodious arrangements, although some plants may have been improperly referred to them.

MONOEMUGI, or **NIMAAMA,** in *Geography*, a kingdom of Africa, having, as it is said, great extent, and reaching northward to Abyssinia; bounded on the E. by the kingdoms of Mongallo, Mozambique, and other small states along the coast of the Indian sea; on the S. by Mocaranga, and on the W. by Congo and Angola; but its real limits have not been ascertained. The sovereign, however, is represented as a rich and powerful prince, and has subdued most of the surrounding and adjacent kingdoms. To this sovereign belong many rich gold, silver, and copper mines, which enable him to carry on commerce with Abyssinia and other countries, as well as with some of the eastern coasts, with whom he is under a necessity of exchanging the precious metals for Indian and European commodities, as he has no port of his own in either the eastern or western sea. Elephants being numerous supply vast quantities of ivory for this trade, and afford to the emperor considerable profit, as well as benefit to his subjects. M. de Lisse, in his Atlas, divides this kingdom into the five following provinces or sovereignties: viz. the Maracates, the Mossagueras, the kingdom of the Bengas, of Maity, and of Maravi; and this last M. d'Anville places on the southernmost border of the lake of that name.

MONOGAMIA, in *Botany*, from *μονος* and *γαμος, a simple marriage*, the sixth order of the class *Syngenesia* in the Linnæan system, as left by its author, destined to admit such genera as have their anthers combined, the flowers being simple. Such were supposed to be *Lobelia*, *Viola*, *Impatiens*, *Jasione*, among British plants, and the exotic *Scripium*, *Strumpfia*, and *Corymbium*, to which might be added *Calicera*, Cavan. Ic. t. 358, and *Barreria* of Schreber. But the union of the anthers is found by no means universal throughout all the species of these genera, at least of the two first, which are very natural genera; and on the other hand this union occurs here and there among the species of others no less natural, as *Gentiana*. In short, the character in question proves of no avail in simple flowers; nor is there any natural affinity, between the above British genera at least, and the most natural class of compound flowers with combined anthers, the true *Syngenesia*. *Scripium* and *Corymbium* cause no difficulty; for they are in every respect genuine Syngenesious plants, and though the florets are solitary in each partial calyx, the flowers are aggregate, or collected in a common calyx; so that they readily go to the 5th order of *Syngenesia*, termed *Polygemia-segregata*, and serve but to strengthen and confirm that most natural class. The order *Monogamia* is now therefore generally abolished, certainly with great advantage. The plants which composed it are removed to *Pentandria Monogynia*, where most of them meet with many natural allies. *Calicera* of Cavanilles appears to be referrible to *Syngenesia Polygemia-segregata*. The affinity of *Strumpfia* is doubtful. *Barreria*, Aublet's *Poraguiba*, is considered by Jussieu as akin to his *Berberides*.

MONO-

MONOGAMY, compounded of *monos*, *solus*, and *γυνή*, *marriage*, the state or condition of those who have only married once, or are restrained to a single wife. See **POLYGAMY**.

MONOGASTRIC, in *Anatomy*, a name given by Vicentini, and some of the French writers, to one of the muscles of the ear, called by Cowper the *internus auris*, and more properly by Albini, the *tensor tympani*.

MONOGRAM, **MONOGRAMMIS**, a cipher, or character, composed of one or more letters interwoven; being a kind of abbreviation of a name; anciently much used as a badge, seal, arms, &c.

Among medallists, a monogram is the name of a prince, city, or the like, of which the characters are, as it were, woven together, and the limb of one character applies to three or four others; so that in the small space of one or two characters a whole name is comprehended.

Under the eastern empire, it is usual to find **MIK**, which are the monogram of Maria, Jesus, Constantine.

The use of monograms is of an ancient standing, as appears from Plutarch, and from some Greek medals of the time of Philip of Macedon, Alexander his son, &c. The Roman *Imperium* bore the monogram of Jesus Christ, consisting of two letters, a **P** placed perpendicularly through the middle of an **X**, *e. gr.* , as we find it in several medals of the time of Constantine, those being the two first letters of the word *Χριστός*, *Christ*.

Kings formerly marked their coins with their monograms: of this we have instances in Charlemagne's coins. That prince also used the monogram for his signature. Eginhard gives us this reason for it, *viz.* that Charlemagne could not write; and that, having attempted in vain to learn in his grown age, he was reduced to the necessity of signing with a monogram.

The ancients also used monograms as notes, or abbreviations of inscriptions; for the understanding of which we have express treatises of Valerius Probus, Sert. Ursatus, &c.

MONOGRAPHI, in *Botany*, authors who have written express treatises on only one plant; as Douglas on the Guernsey lily, &c.

MONOGYNIA, from *μνος*, *one*, and *γυνή*, *a female*, is the name of such orders in the first thirteen classes of the Linnæan system, as have a single style, or sessile stigma, in each flower. A single style however is by no means confined to these classes, being universal in the 14th and 15th as well as in the 17th and 19th, all very extensive and natural classes of the same system, and it occurs here and there amongst the others; though in none of these instances does it give a denomination to any order, or section. See **DIGYNIA**.

MONOK, in *Geography*, a town of Hungary; 12 miles W.N.W. of Tokay.

MONOKA, a river of Maryland, which runs into the Chesapeake. N. lat. 38° 10'. W. long. 76° 53'.

MONOLOGUE, Fr. an opera tune by one actor alone, who only speaks or rather sings to himself. In declamation it is a soliloque. "It is in monologues (say the French) that all the powers of music are displayed; the performer giving way to all the ardour of his genius, unrestrained in the length of his air or recitative by the presence of an interlocutor." The accompanied recitatives of the Italians, which produce such great effects, are always monologues.

MONOMACHIA, *Μονομαχία*, from *μνος*, *solus*, and *μαχη*, *combat*, a duel, or single combat of man against man.

Monomachia was anciently allowed by law, for the trial

or proof of crimes. It was even permitted in pecuniary causes, as appears by ancient records. It is now forbidden both by the civil and canon laws. See **COMBAT**.

Alciat has written a treatise "De Monomachia."

MONOMERES, a word used by the ancients as a one, but more frequently joined with the word *phorbæa*, to express one sort of the handle used to confine the head, by those who played on the ancient pipe. This consisted only of one straight and one transverse piece; and the latter came fully over the mouth, and closed it up, except that a hole was cut in it to receive the mouth piece of the pipe. The *diemeræ* consisted of several pieces, and only tied up the lower lip.

MONOMIAL, in *Algebra*, a root or quantity that has but one name; or consists but of one part or member. Such are *ab*, *aab*, *aaabb*. See **QUANTITY**, **BINOMIAL**, **TRINOMIAL**, **ROOT**, &c.

Monomials may be either rational, or irrational.

MONOMIES CASTLE, in *Geography*, a fort of America, on the river Winnebago. N. lat. 44° 18'. W. long. 87° 34'.

MONOMIES River, a river of North America, from which is derived the name of a tribe of Indians, and which runs into that part of lake Michigan, called "Green bay," N. lat. 44° 46'. W. long. 87° 27'.

MONOMONIL, a town of N. America, on the W. side of Green bay. N. lat. 44° 32'. W. long. 87° 28'.

MONOMOTAPA. See **MOCARANGA**.

MONONGAHELA RIVER, a branch of the Ohio, 400 yards wide at its junction with the Alleghany at Pittsburg; navigable with batteaux and barges beyond Redstone creek, and still farther with lighter craft. It rises at the foot of the Laurel mountain in Virginia, passes into Pennsylvania, separates Fayette and Westmoreland from Washington county, and then joining the Alleghany river at Pittsburg, forms the Ohio.

MONONGALIA, a county in the N.W. part of Virginia, about 40 miles long and 30 broad; containing 8540 inhabitants.

MONOPAGIA, a word used by some *medical* writers, for that species of head-ache which affects only one point, or small part of the head.

MONOPETALOUS, in *Botany*, a flower whose *corolla* consists of but one piece, or petal, as in the Primrose. A monopetalous corolla is almost universally tubular. Very rarely the tube is slit, from top to bottom, at one side, as in *Goodenia* and *Sevolvæ*. There are indeed a few monopetalous flowers which seem to be so from a partial defect, as *Amorpha*, the only petal of whose corolla is the standard (*vexillum*), the wings and keel being wanting, though the form of every part of the fructification, as well as the habit of the shrub, indicates its strictly papilionaceous nature. Another genus, *Rittera* of Schreber, (*Possira* of Aublet and Jussieu) which is also of the leguminous kind, though not papilionaceous, has a single lateral petal, of a broad roundish figure, with a very short claw. (See **RITTERA**.) The distinction between a monopetalous and polypetalous corolla, is the most absolute of all, in the systems of those who arrange plants by this part; and is indeed less liable to variation than even the absence or presence of the corolla itself. See **COROLLA** and **CLASSIFICATION**.

MONOPHAGI, *Μονοφαγίαι*, in *Antiquity*, a designation given to those who celebrated the Ægeian festival, because they feasted or eat together without the assistance of their servants; none but the denizens of that island being allowed to be present.

MONOPHYSITES, from *μονος, solus*, and *φύσις, natura*, in *Ecclesiastical History*, a general name given to all those sectaries in the Levant, who only own one nature in Jesus Christ; and maintain, that the divine and human natures of Christ were so united, as to form only one nature, yet without any change, confusion, or mixture of the two natures. See **EUTYCHIANS**.

The Monophysites, however, properly so called, are the followers of Severus, a learned monk of Palestine, who was created patriarch of Antioch in 513, and Petrus Fullensis, whence they were called "Severians."

The Monophysites were encouraged by the emperor Anastasius, but depressed by Justin and succeeding emperors. However, this sect was restored by the eloquence, activity, and diligence of Jacob Baradæus, an obscure monk, inasmuch, that when he died bishop of Edessa, A.D. 578, he left it in a most flourishing state in Syria, Mesopotamia, Armenia, Egypt, Nubia, Abyssinia, and other countries. The laborious efforts of Jacob were seconded in Egypt, and the adjacent countries, by Theodosius, bishop of Alexandria, and he became so famous, that all the Monophysites of the East considered him as their second parent and founder, and are to this day called Jacobites, in honour of their new chief. The Monophysites are divided into two sects or parties; the one African, the other Asiatic: at the head of the latter is the patriarch of Antioch, who resides, for the most part, in the monastery of St. Ananias, near the city of Merdin, his episcopal seat; and also at Amida, Aleppo, and other Syrian cities: the former are under the jurisdiction of the patriarch of Alexandria, who generally resides at Grand Cairo, and are subdivided into Copts and Abyssinians. From the fifteenth century downwards, all the patriarchs of the Monophysites have taken the name of Ignatius, in order to shew that they are the lineal successors of Ignatius, who was bishop of Antioch in the first century, and consequently the lawful patriarchs of Antioch. In the 17th century, a small body of the Monophysites in Asia, abandoned, for some time, the doctrines and institutions of their ancestors, and embraced the communion of Rome: but the African Monophysites, notwithstanding that poverty and ignorance which exposed them to the seductions of sophistry and gain, stood firm in their principles, and made an obstinate resistance to the promises, presents, and attempts employed by the papal missionaries, to bring them under the Roman yoke: and in the 18th century, those of Asia and Africa have persisted in their refusal to enter into the communion of the Roman church, notwithstanding the earnest intreaties and alluring offers, that have been made from time to time by the pope's legates, to conquer their inflexible constancy. The Monophysites propagate their doctrine in Asia with zeal and assiduity, and have not long ago gained over to their communion a part of the Nestorians, who inhabit the maritime coasts of India. Mosheim's *Eccl. Hist.*

MONOPIN HILL, in *Geography*, a hill on the island of Banca, which forms the N.E. point of the entrance of the Straits. S. lat. 2° 3'. E. long. 105° 18'. The difference of longitude between the island Lusepara, which lies in the S. entrance of the Straits of Banca, and Monopin hill, which forms one side of the entrance from the north, is 55'. See *Straits of BANCA*.

MONOPOLI, a town of Naples, in the province of Bari, on the coast of the Adriatic sea; the see of a bishop; containing six churches and nine convents; 144 miles E. of Naples. N. lat. 41° 8'. E. long. 17° 19'.

MONOPOLY, strictly speaking, in the language of the law, is very similar to engrossing: the latter is the act of

buying up corn and other provisions, for the purpose of selling them again; the former is the same offence, extended to other branches of trade: both are supposed to be done for the purpose of gaining the entire command of the market, and by this means raising the prices of the commodities engrossed or monopolised.

Monopoly is also a term applied to a "licence or privilege allowed by the king, for the sole buying, selling, making, working and using of any thing whatsoever, whereby the subject is restrained from that liberty of manufacturing or trading which he had before." These licences and privileges, in all despotic governments, have been made use of to favour and enrich individuals; or, by the sale of them; to contribute to the wants of the sovereigns: and even in freer governments, ignorant of the real mode of promoting industry and enriching the people, licences and privileges of this kind have been too frequently granted on the erroneous idea, that their commerce would be fostered and protected in its infancy. In this kingdom, during the reigns of Elizabeth and James I. monopolies were carried to a most vexatious and destructive extent; so that many branches of trade and manufacture were absolutely closed, except to those who had obtained licences to engage in them, and the great body of consumers were inadequately supplied with bad articles at an exorbitant rate. These evils at last became so oppressive and glaring, that by the 21st James I. c. 3. all such monopolies were declared to be contrary to law and void (except patents to the authors of new and useful inventions, for a term not exceeding fourteen years). By the same statutes, monopolists are liable to be punished by treble damages and double costs, if they disturb any persons engaged in a trade to which they claim the privilege of monopoly. This statute evidently refers only to those cases where a monopoly licence is claimed, and endeavoured to be acted upon, so as to disturb the trade of those engaged in the same line.

The engrossing or monopoly of corn and provisions is an offence at common law, and is described by statute 5 and 6 Edw. VI. c. 14.; by this statute, the penalty is the forfeiture of the goods or their value, and two months imprisonment for the first offence; double value, and six months imprisonment for the second; and for the third, the offender to forfeit all his goods, to be set in the pillory, and imprisoned at the king's pleasure.

Monopoly, as a subject in political economy, may be considered under three points of view. In the first place, the practicability of the alleged crime of getting into one's possession, or buying up, all, or such a quantity of, any commodity as will give the command of the market, and consequently of the price. In the second place, the monopoly, which by patent is given for a term of years, to the authors of new and useful inventions: the propriety and policy of this kind of monopoly afford ample room for discussion; of course, if this kind of monopoly were to be set aside, some other mode of rewarding the authors of new inventions, less objectionable, must be suggested: this kind of monopoly will be considered under the article **PATENT**. In the third place, that species of monopoly, wherein a government grants either to a body of men, which secures them any particular trade; or to the nation at large, by which the colonial trade is not suffered to be touched by any foreign nation. This last species of monopoly, or the monopoly of the colonial trade, will be considered under the article **NAVIGATION Act**: at present, therefore, we shall confine our observations to the alleged crime of engrossing or monopolizing any commodity, for the purpose of commanding the market, and raising the price; and to that monopoly which

which a government grants to any particular body of men, by which they alone can carry on the trade which is the object of the monopoly

Smith's opinion respecting engrossing and forefalling is well known: the popular fear respecting them he compares to the popular terrors and suspicions of witchcraft, and he concludes by observing, that the law which should restore entire freedom to the inland trade of corn would probably prove as effectual to put an end to the popular fears of engrossing and forefalling; as the law which put an end to all prosecutions for witchcraft, destroyed the fear and suspicion of it, by taking away the great cause which encouraged and supported them.

Indeed, when we consider the numerous and great obstacles and difficulties which must lie in the way of every person who attempts to get into his possession the whole, or the greater part of any commodity; the immense capital, or credit which he must possess; the confidence he must place on the integrity of his agents, and the reliance he must have on their skill and judgment; the effect on the price of the commodity, which his attempts to monopolize it must necessarily produce; and the great probability that he will be compelled to desist from his undertaking, long before he has brought it to a close, from an erroneous calculation of his means: it will appear evident that it cannot be the interest of any man to risque his capital in such an absurd and impracticable undertaking. If there should be persons so blind to their own interests as to begin the attempt, their punishment may safely be left to flow from their own measures, as, long before they can materially, or even in a trifling degree, injure the public, they will either open their eyes to their own folly, or be incapacitated by their own ruin from proceeding in their enterprise.

But though monopoly, strictly speaking, appears thus impracticable, yet there is no doubt that the price of commodities may be partially and temporarily affected by the quantity of capital possessed by those who have them for sale. It is well known that if the farmer, for instance, be straightened for money, he will be compelled to bring his grain to market early in the season, in a much larger proportion than if his capital were sufficient to enable him to pay his rent, and carry on his agricultural labour, without having recourse to this measure: if, on the other hand, his capital is such, that he has no occasion for the money the early sale of his corn would produce, he will bring it to market only in those quantities, and at those seasons, which he thinks will conduce most to his own interest. At first sight it might seem as if the public would be most benefited by farmers of the former description; but a very little reflection will convince us, that the temporary reduction in the price of corn, occasioned by their want of adequate capital, will be much more than balanced, in a national point of view, by the unequal distribution of it through the year, to which this will give rise, as well as by the want of economy in the use of it, which the forced and unauthorized reduction of it will produce.

It may then safely be inferred that the attempt to monopolize any commodity is so absurd, and so contrary to the most narrow and obscure views of self-interest, that no law is necessary to prevent or punish it; and that, with respect to the supposed effect of capital, in raising the price of commodities, in many points of view capital, by enlarging the quantity produced, and giving rise to competition, must have the opposite effect; while an inadequate capital must narrow and thwart the industry and operations of the possessor, and even at the time that it compels him to dispose

of his produce, is injurious, not only to himself, but to the nation at large.

In a monopoly of the colony trade, no particular body of men in the nation are favoured: the monopoly regards the whole nation as contradistinguished from foreigners: but in the monopoly of any trade granted by government to a particular body of men, the privilege is granted at the expense, and to the loss of the rest of the nation. This is the first and most striking evil, but there are others not inferior in magnitude and extent. Not only is a large portion of the nation excluded from the means of increasing their industry and consequently their wealth; but they are compelled to purchase the articles of the monopoly trade at the monopoly price, and to sell such articles as they manufacture for that trade, at the price which the holders of the exclusive privilege may choose to give. Nothing supplies a market so regularly, or so cheaply, or with goods of such good quality, as open and fair competition; nothing, on the contrary, renders the supply so irregular, or the goods so high priced, or of such inferior quality, as monopoly. For these and various other subordinate reasons, therefore, a monopoly trade must be injurious to the nation at large; and it not unfrequently happens that it is conducted with such negligence, ignorance, and extravagance, as not to be beneficial to those who possess it. Under certain circumstances, when there was little spirit of enterprise, when individual capital was small, and combined with these circumstances, in cases where the risque was great, where great length of time was necessary to establish the trade, and where the returns, at first, were slow and trifling, it might have been wise and politic to grant exclusive privileges of trade; but certainly it cannot be wise and politic to grant or to continue them, under circumstances of an opposite description.

MONOPS, in *Natural History*, a name given by Ælian, and some other of the old Greek writers, to the bonasus. The name *monopus* was given this animal, according to Aristotle, by the people of the country where the creature was most frequent, and therefore is not to be attempted on any Greek etymology. Some of the Greeks have called the same creature *monopos*, and some *bsinthos*.

MONOPTERE, *Μονοπτερος*, a kind of temple among the ancients, round, and without walls; having its dome supported by columns.

MONOPTOTE, *Μονοπτοτον*, in *Grammar*, a noun, which has only one case; as *inficis*.

MONOPTRAL TEMPLE, in *Architecture*, an edifice, consisting of a circular colonnade supporting a dome. The monoptral temple is open, or without any inclosing wall, and consequently without a cell, as in other temples.

MONOPYRENEOUS FRUITS, in *Botany*, are such as only contain one kernel or seed.

MONORCHIS, the specific name of an *Ophrys* in Linnæus, Sm. Fl. Brit. 936. Engl. Bot. t. 71, which remains in the same genus in Dr. Swartz's new arrangement of this tribe. It is so called from having but one apparent globular-bulb, or rather knob, to the root; the other being formed at the end of a longish shoot, about, or after, the time of flowering, so as commonly to escape observation.

MONORCHIS. Beside the common signification of this word as the name of a plant, physicians have also used it to express a man who has but one testicle.

MONORHYMÆ, from *μονος*, *solus*, and *ῥυμη*, *rhyne*, a poetical composition, all the verses of which end with the same rhyme.

Monorhymes are said to have been invented by the old French poet Leonin, who addressed some Latin verses of

this kind to pope Alexander III., whence they are also called *Leomne verses*.

MONOS, in *Geography*, a river of Guinea, which runs into the Atlantic, 15 miles S. of Tombi.

MONOSPERM-ALTHÆA, in *Botany*, a name contrived by Inard for the *Waltheria* of Linnæus, and intended to express a plant of the Marsh-mallow kind, with a single seed. See *WALTHERIA*.

MONOSTICH, MONOSTICHON, an epigram, or poetical piece, consisting of one single verse.

MONOSYLLABLE, MONOSYLLABUM, a word of a single syllable; or, that consists of one or more letters which are pronounced together.

The French language abounds in monosyllables more than any other. This renders it the more perplexing to foreigners, and yet the beauty of the language seems to consist in it. One of the best and smoothest lines in Malherbe consists of twelve monosyllables: speaking of Calista, he says, "Et moi je ne voi rien quand je ne la voi pas." In this the genius of the English tongue differs very much from the French, an uninterrupted series of monosyllables in the former having always an ill effect. This Mr. Pope both intimates and exemplifies in the same verse. "And ten low words oft creep in one dull line." Pasquier cites an elegy of forty-two verses, consisting wholly of monosyllables.

MONOTHELITES, compounded of *μονος*, *single*, and *θελημα*, *will*, of *θελω*, *volō*, *I will*, in *Ecclesiastical History*, an ancient sect, which sprung out of the Eutychians and Monophysites; thus called, as only allowing of one will in Jesus Christ.

The opinion of the Monothelites had its rise in 630, and had the emperor Heraclius for an adherent, who, by publishing an edict in favour of it, hoped thus to restore peace and concord both in church and state: it was the same with that of the Acephalous Severians.

They allowed of two wills in Christ, considered with regard to the two natures; but reduced them to one, by reason of the union of the two natures; thinking it absurd there should be two free wills in one and the same person. See *ECITHESIS* and *TYPE*.

They were condemned by the sixth general council, in 680, as being supposed to destroy the perfection of the humanity of Jesus Christ, depriving it of will and operation. Mosheim gives the following account of the state of this subtle controversy; the grounds of which are not, indeed, easily understood and explained. 1. The Monothelites declared, that they had no connection with the Eutychians and Monophysites; but maintained, in opposition to both these sects, that in Christ there were two distinct natures, which were so united, though without the least mixture or confusion, as to form by their union only one person. 2. They acknowledged, that the soul of Christ was endowed with a will, or faculty of volition, which is still retained, after its union with the divine nature. For they taught, that Christ was not only perfect God, but also perfect man; whence it followed, that his soul was endowed with the faculty of volition. 3. They denied that this faculty of volition in the soul of Christ was absolutely inactive; maintaining, on the contrary, that it co-operated with the divine will. 4. They, therefore, in effect, attributed to our Lord two wills, and these, moreover, operating and active. 5. They, however, affirmed, that, in a certain sense, only one will and one manner of operation were in Christ. Their sentiments were afterwards embraced by the Maronites.

MONOTOCA, in *Botany*, from *μονος*, *one*, and *τοκος*;

a fetus, or *conception*, because the germen has, from the first, the rudiments of but one seed, by which this genus is distinguished from others of its natural order. Brown. Prodr. Nov. Holl. v. 1. 546.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Epacridee*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of five equal, erect, concave, permanent leaves, with a pair of smaller ones at the base, which are sometimes deciduous. *Cor.* of one petal, funnel-shaped, twice the length of the calyx; its limb in five equal, spreading, smooth, beaked segments; throat naked and pervious. Nectary a lobed cup-shaped gland, surrounding the base of the germen. *Stam.* Filaments five, thread-shaped, equal, inserted into the tube of the corolla, shorter than its limb; anthers oblong, incumbent. *Pist.* Germen superior, roundish; style columnar, short; stigma obtuse. *Peric.* Drupa oval, pulpy. *Nut* solitary, oval, of one cell. *Seed* solitary.

Eff. Ch. Outer calyx of two leaves. Corolla five-cleft, funnel-shaped, naked at the mouth and border. Germen single-seeded. Drupa pulpy.

A New Holland genus of shrubs, or small trees, separated by Mr. Brown from the *Styphelia* of preceding authors, on account of the above characters. The leaves are feathered, simple. Spikes axillary, rarely terminal, of few flowers, which are small, white, often becoming dioecious, by a partial defect in their organs of impregnation.

Section 1. *Outer calyx deciduous. Small trees, with dioecious flowers.*

1. *M. elliptica.* (*Styphelia elliptica*; Sm. Bot. of New Holl. 49.)—Clusters erect, either nearly terminal and aggregate, or axillary and solitary. Leaves elliptic-oblong, four times as long as broad.—Sent by Dr. J. White, in 1793, from the neighbourhood of Port Jackson, New South Wales, where it was also gathered by Mr. Brown. The branches are variously divided, round, leafy, downy when young. Leaves numerous, scarcely an inch long, obovate or elliptic-lanceolate, entire, tipped with a spinous point; dark glaucous green and smooth above; pale, convex, with somewhat radiating, but nearly parallel, ribs beneath. Footstalks broad and short. Clusters about the length of the leaves, their stalks angular and downy. Bractees solitary, concave, at the base of each partial stalk. Flowers scarcely a line in length. The outer calyx is permanent in our specimens.

2. *M. albens.* Br. n. 2.—Clusters erect, solitary, either terminal or axillary. Leaves oblong-linear, acute, spinous-pointed, white beneath.—Native of Port Jackson. Like the former, but the leaves are longer, narrower, and paler, more tapering at the point, their edges appearing minutely crenate under a microscope.

3. *M. lineata.* Br. n. 3. (*Styphelia glauca*; Labill. Nov. Holl. v. 1. 45. t. 61.)—Spikes axillary, very short, drooping, stalked. Leaves elliptic-oblong, acute, spinous-pointed, nearly flat.—Native of Van Diemen's land, where it was gathered by both the above authors. The shape of the leaves is most like the first species, but the very short, axillary, stalked, obtuse spikes (not clusters), which Mr. Brown says are drooping, though the French author represents them erect, distinguish the present plant. The germen is, erroneously it seems, drawn with five cells in Labillardiere's plate.

Section 2. *Outer calyx permanent. Shrubs, with both organs of the flower perfect.*

4. *M. scoparia.* (*Styphelia scoparia*; Sm. Bot. of New Holl. 48.)—Spikes axillary, very short, nearly sessile, drooping, of few flowers. Leaves linear-oblong, somewhat revolute.

revolute. Stem erect.—Native of Port Jackson, New South Wales. The stem is very bushy, branched in a determinate manner, smooth throughout. Leaves numerous, about half an inch long, narrow, but somewhat elliptical, entire, spinous-tipped, the edges reflexed. Flowers small, three or four, in a little, recurved, minutely bracteated, spike.

5. *M. empetrifolia*. Br. n. 5.—"Spikes axillary, drooping, of two or three flowers. Leaves oblong-oval, pointed, divaricated; convex above; striated and whitish beneath. Stem prostrate."—Gathered by Mr. Brown in Van Diemen's land. Of this we have no specimen.

MONOTONIA, MONOTONY, in Rhetoric, a want of variation, or inflexion of the voice; or a fault in pronunciation, where a long series of words is delivered with one unvaried tone. This is one of the principal faults of our English orators.

Dr. Blair observes, that monotony is the great fault into which writers are apt to fall, who are fond of harmonious arrangement; and to have only one tune, or measure, is not much better than having none at all. A very vulgar ear will enable a writer to catch some one melody, and to form the run of his sentences according to it; which soon proves disgusting. But a just and correct ear is requisite for varying and diversifying the melody; and hence we so seldom meet with authors, who are remarkably happy in this respect.

In pronunciation, care should be taken to guard against monotony. It is justly observed by a good writer on this subject, that for an orator always to use the same tone or degree of his voice, and to expect to answer all his views by it, would be much the same thing, as if a physician should propose to cure all distempers by one medicine. From hence it is evident, that though various inflections and tones of the voice are requisite to make it harmonious and pleasing to the ear, yet the degree of it should differ according to the nature of the subject, and design of the speaker. And as a perfect monotony is always unpleasant, so it can never be necessary in any discourse. Lect. on Rhet., &c. vol. i. Ward's Orat., vol. ii. See PERIOD, PRONUNCIATION, SENTENCE, and VOICE.

Monotonia is opposed to chanting or singing in speaking.

MONOTONOUS, MONOTONY, used figuratively in music, except in speaking of drums, implies dull, psalmodic strains, always in the same style or key.

MONOTRIGLYPH, in Architecture, denotes the space of one triglyph, between two pilasters or two columns.

MONOTROPA, in Botany, received that appellation from Linnæus, in exchange for *Hypopitys*, though the alteration seems, in our humble opinion, by no means for the better. The word is formed from *μονος*, one, and *τροπον*, to regard or consider, alluding to the regard paid by its author to the single terminal flower, for the determination of the class and genus, in preference to the lateral ones, according to a favourite principle assumed by himself, and exemplified in this genus, *Ruta*, *Adoxa*, *Chrysofplenium*, and others. He appears in the *Philosophia Botanica*, p. 186, to have lost sight of this original idea, classing the name in question with those deduced from the soil, stumbling, as it were, between *solum* and *solus*; an error rather to be lamented than censured, when we reflect that this immortal book was dictated hastily from a sick bed. (See LINNÆUS.) We must nevertheless still contend, that the name previously bestowed on this plant by Bauhin and Dillenius, from *υπο*, under, and *τροπος*, a fir-tree, alluding to its perhaps invariable station, was liable to no exception. Linn. Gen. 214. Schreb. 291. Willd. Sp. Pl. v. 2. 573. Mart. Mill. Dict. v. 3. Sm.

Fl. Brit. 440. Juss. 430. Michaux Boreali-Amer. v. 1. 266. (*Hypopitys* Dill. Gen. 134. t. 7.)—Class and order, *Dicandria Monogynia*. Nat. Ord. doubtful, Linn. Juss. The latter observes, that it is "a genus by itself, akin to no other." Its habit is that of *Cytinus*, whatever difficulty there may be in bringing them together by technical characters. The want of green in the colour of such parasitical plants is remarked by Linnæus, in Fl. Suec. 135, though the discovery has lately been attributed to one of his pupils.

Gen. Ch. Cal. none, unless the five outer petals be considered as a coloured calyx. Cor. Petals ten, inferior, oblong, erect, parallel, serrated at the extremity, deciduous; the five outermost, or alternate, ones gibbous at the base, concave, and bearing honey, at the inside. Stam. Filaments ten, awl-shaped, erect, simple; anthers simple, two-lobed. Pist. Germen superior, roundish, pointed; style cylindrical, the length of the filaments; stigma capitate, obtuse. Peric. Capsule ovate, with five angles, obtuse, of five valves. Seeds numerous, chaffy.

Obs. This description is taken from the terminal flower, according to the rule in *Phil. Bot.* sect. 178. The lateral flowers, in such species as have any, lose one-fifth, in the number of every part of the fructification.

Ess. Ch. Calyx none. Petals ten; the five outermost concave and honey-bearing at their base. Capsule superior, of five valves.

1. *M. Hypopitys*. Yellow Bird's-nest. Linn. Sp. Pl. 555. Engl. Bot. t. 69. Fl. Dan. t. 232. Ehrh. Phytoph. 44. (*Orobanche hypopitys lutea*; Mentz. Pugill. t. 3. Morif. sect. 12. t. 16. f. 13.)—Flowers spiked, externally smooth, as well as their bractæas; the lateral ones octandrous.—Native of fir woods in Europe and North America, growing parasitically on the roots of those trees, and flowering in July. Dillenius says, on the authority of Mr. Manningham, that it grows also in beech woods. Michaux asserts the American plant to be but half the size of the European. With us it is nearly a span high. The whole herb succulent, of a pale straw-colour, turning brownish when arrived at maturity, and then acquiring a fragrant smell, like that of primrose flowers, though generally compared to their roots. The stem is simple, thick, round, clothed with scattered ovate scales, rather than leaves, and terminating in a spike of several flowers, at first drooping, finally erect. Each flower is accompanied by a bractæa, exactly resembling the scales of the stem, rather shorter than the flower, which, with its very short partial stalk, is nearly an inch long. Sometimes the filaments, and inner side of the petals, are hairy. Willdenow says there is a variety with upright flowers, which is occasionally single-flowered. We have sometimes found the lateral blossoms with only six petals and stamens.

2. *M. lanuginosa*. Downy Bird's-nest. Michaux n. 2.—Flowers spiked, all over downy, as well as their bractæas.—Sent from North America, by Kalm, to Linnæus, who confounded it with the former. Michaux gathered the same in the woods of North Carolina. He justly describes it as having the habit of the foregoing, but smaller in all its parts, varying with a drooping or upright spike, the flowers turned all one way. The scales of the stem are rather pointed. The stem, scales, petals, and every other part of the flowers, are clothed with fine, soft, dense hairs, peculiar to this species. The specimen of the former in the Linnæan herbarium, as well as one we have from France, has indeed scattered hairs on the filaments, as well as on the inner side of the petals, near the edge. Whether these indicate a specific distinction,

distinction, we have not materials to decide, but we have seen them in no British specimen.

3. *M. uniflora*. Drooping Single-flowered Bird's-nest. Linn. Sp. Pl. 555. Michaux n. 3. (Orobanche virginiana, flore pentapetalo cernuo; Pluk. Phyt. t. 209. f. 7.)—Stem single-flowered. Scales bluntish. Flower pendulous.—Native of Maryland, Virginia, and Canada; Linn.; of shady woods in South Carolina; Michaux. Root a dense congeries of entangled fibres. Stem about six inches high, seldom quite straight in any part, angular, smooth. Scales obovate, bluntish, smooth, scattered, not numerous. Flower terminal, solitary, perfectly pendulous, the upper part of the stem, for about an inch, being curved into an arch. Corolla bell-shaped, the size of the first species, or bigger. Stamens ten, hairy. Plukenet's figure is very good.

4. *M. Morifoniana*. Upright Single-flowered Bird's-nest. Michaux n. 4. (Orobanche monanthos virginiana, flore majore; Morif. sect. 12. t. 16. f. 5.)—Stem single-flowered, straight. Scales lanceolate. Flower erect.—Native of the shady woods of Carolina. Michaux. A specimen, sent by Kalm from North America, is confounded in the Linnæan herbarium with the last. The stem of the present species is nearly twice the height of *M. uniflora*, perfectly straight, except its taper base, which is slightly flexuose. Scales larger, more lanceolate and acute, especially the upper ones. Flower always perfectly erect, about the size of the last, or rather bigger, with ten petals, and as many hairy stamens.

Morison's figure, with which Linnæus finds fault, supposing it done for the foregoing, expresses this species sufficiently well. Michaux has first distinguished the two, and, as it appears to us, very justly. He describes the scales as more distant in the present, which is not the case in the only specimen we have seen, any more than in Morison's plate. The stem, in five specimens of the *uniflora* before us, is also the most slender of the two; Michaux terms it thick, as well as shorter than the other.

No successful attempt, as far as we have heard, was ever made to cultivate any of this genus; yet as gardeners now succeed with several of the *Orchidææ*, at one time thought quite as unmanageable, we know not why they should despair, even of these parasitical plants. Rotten stumps of fir, placed so as to receive their minute seeds, and then removed into a fit situation, might possibly attain the desired end. S.

MONOU, in *Geography*, a country of Africa, north of the Grain coast.

MONOVAC, a town of Spain, in the province of Valencia; 21 miles W. of Alicant.

MONOULLAH, a town of Bengal; 12 miles N.W. of Goragot.

MON-PADRE, a town of the island of Margareta.

MONPARA, a river on the west coast of the island of Borneo, which runs into the sea, N. lat. $0^{\circ} 36'$. E. long. $109^{\circ} 33'$.

MONPAZIER, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Bergerac; 18 miles S.W. of Sarlat. The place contains 1028, and the canton 4691 inhabitants, on a territory of 245 kilometres, in 14 communes. N. lat. $44^{\circ} 40'$. E. long. $0^{\circ} 59'$.

MONPON, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Ribérac. The place contains 1500, and the canton 5615

inhabitants, on a territory of $247\frac{1}{2}$ kilometres, in 10 communes.

MONQUEGNA, a jurisdiction of South America, in the diocese of Arequipa; about 40 leagues S. of the city of Arequipa, and 16 from the coast of the South sea. This jurisdiction extends at least 40 leagues in length, in an agreeable climate, adorned with large vineyards, from the produce of which great quantities of wine and brandy are made, which constitute its whole commerce. They supply all the provinces bordering on the Cordilleras, as far as Potosi, by land carriage; while they are exported by sea to Callao, where they are greatly valued. Here are also papas and olives. The principal town, which bears the same name, is inhabited by Spaniards, among whom are several noble and opulent families. S. lat. $17^{\circ} 24'$. W. long. $70^{\circ} 56'$.

MONREAL, a town of Spain, in Aragon; 23 miles W. of Calataud.—Also, a town of Spain, in Navarre; 8 miles S.E. of Pamplona.

MONREALE, a town of Sicily, in the valley of Mazara, situated on a lofty hill; 3 miles W.S.W. of Palermo.

MONRO, ALEXANDER, M.D., in *Biography*, an eminent anatomist, and the father of the medical school of Edinburgh, was descended both by his paternal and maternal parents from distinguished families in the north of Scotland. He was born in London, in September 1697, where his father, then a surgeon in the army of king William in Flanders, resided upon leave of absence in the winter. On quitting the army, Mr. Monro settled in Edinburgh; and perceiving early indications of talent in Alexander, his only child, he took great interest in superintending his education. After having given him the best instruction which Edinburgh then afforded, he sent him to London, where he attended the anatomical courses of Cheselden, and was extremely assiduous in dissections: he made numerous anatomical preparations, which he sent home; and, while here, even laid the foundation of his most important work on the bones, a sketch of which he read before a society of young physicians and surgeons, of which he had been elected a member. From London, Alexander went to Paris, where he pursued the same object; and in the autumn of 1718, repaired to Leyden, with the view of profiting by the tuition of the great Boerhaave, who conceived a high opinion of his talents and industry, and wrote a favourable account of him to his friends. On his return to Edinburgh, in the autumn of 1719, he was appointed professor and demonstrator of anatomy to the company of surgeons, the joint demonstrators having spontaneously resigned in his favour. Soon after accepting this appointment, he began also to give public lectures on anatomy, illustrating them by the preparations which he had made when abroad; and at the same time Dr. Alston, then a young man, united with him in the plan, and began a course of lectures on the materia medica and botany. These were the first public courses that had ever been given at Edinburgh, and may be regarded as the opening of that medical school, which has since extended its fame, not only throughout Europe, but over the new world. Mr. Monro suggested this plan; and by the following circumstance, probably, contributed to lead his son into a mode of lecturing, which subsequently carried him to excellence. Without the young teacher's knowledge, he invited the president and fellows of the College of Physicians, and the whole company of surgeons, to honour the first day's lecture with their presence. This unexpected company threw the doctor into such confusion, that he forgot the words of the discourse, which he had written and committed to memory.

Having

Having left his papers at home, he was at a loss for a little time what to do: but, with much presence of mind, he immediately began to draw some of the anatomical preparations, in order to gain time for recollection; and very soon resolved not to attempt to repeat the discourse which he had prepared, but to express himself in such language as should occur to him from the subject, which he was confident that he understood. The experiment succeeded: he delivered himself well, and gained great applause as a good and ready speaker. Thus discovering his own strength, he resolved henceforth never to recite any written discourse in teaching, and acquired a free and elegant style of delivering lectures.

In the same year, 1720, a regular series of medical instruction was instituted at Edinburgh, through the interest of Dr. Monro's father: these two lectureships were put upon the university establishment, to which were soon after added those of Drs. Sinclair, Rutherford, Innes, and Plummer. This system of medical education was, however, incomplete, without affording some opportunity to the students of witnessing the progress and treatment of diseases, as well as of hearing lectures. A proposal was, therefore, made to erect and endow an hospital by subscription; and Dr. Monro published a pamphlet, explaining the advantages of such an institution. The royal infirmary was speedily raised, endowed, and established by charter; and the institution of clinical lectures, which were commenced by Dr. Monro on the surgical cases, and afterwards by Dr. Rutherford, in 1748, on the medical cases, completed that admirable system of instruction, upon which the reputation and usefulness of the medical school of Edinburgh have been subsequently founded.

None of the new professors contributed so much to the celebrity of this school as Dr. Monro, who was indefatigable in the labours of his office, and in the cultivation of his art, and soon made himself known to the professional world by a variety of ingenious and valuable publications. During a period of nearly forty years he continued, without any interruption, to deliver a course of lectures, extending from the end of October to the beginning of May: and so great was the reputation which he acquired, both for himself and the university, that students flocked to him from the most distant corners of the kingdom.

His first and principal publication was his "Osteology, or Treatise on the Anatomy of the Bones," which appeared in 1726, and was intended for the use of his pupils; but it became a very popular work among the faculty in general: for he had the satisfaction of seeing it pass through eight editions during his life, and it was translated into most of the languages of Europe. The French edition, in folio, published by Mr. Sue, demonstrator of sculpture to the Royal Academy of Paris, was adorned with most elegant and masterly figures. To the later editions of this work he subjoined a concise *neurology*, or description of the nerves, and a very accurate account of the lacteal system and thoracic duct.

Dr. Monro was also the father and active supporter of a society, which was established by the professors and other practitioners of the town, for the purpose of collecting and publishing papers on professional subjects, and to which the public is indebted for six volumes of "Medical Essays and Observations by a Society at Edinburgh," the first of which appeared in 1732. Dr. Monro was the secretary of this society; and after the publication of the first volume, when the members of the society became remiss in their attendance, the whole labour of collection and publication was carried

on by himself; "inasmuch that after this," says his biographer, "scarcely any other member ever saw a paper of the five last volumes, except that they were the authors of, till printed copies were sent them by the bookseller." Of this collection, many of the most valuable papers were written by Dr. Monro, on anatomical, physiological, and practical subjects: the most elaborate of these is an "Essay on the Nutrition of the Fœtus," in three dissertations. Haller, speaking of these volumes as highly valuable to the profession, adds, "Monrousibi riminet."

After the conclusion of this publication, the society was revived, at the suggestion of the celebrated mathematical professor, Colin Maclaurin, and was extended to the admission of literary and philosophical topics. Dr. Monro again took an active part in its proceedings, as one of its vice-presidents, especially after the death of Maclaurin, when two volumes of its memoirs, entitled "Essays Physical and Literary," were published, and some materials for a third collected, to which Dr. Monro contributed several useful papers. The third was not published during his life. His last publication was an "Account of the Success of Inoculation in Scotland," written originally as an answer to some inquiries addressed to him from the committee of the faculty of physicians at Paris, appointed to investigate the merits of the practice. It was afterwards published at the request of some of his friends, and contributed to extend the practice in Scotland. Besides the works which he published, he left several MSS. written at different times, of which the following are the principal; *viz.* A History of Anatomical Writers;—An *Encheiridion Anatomica*;—Heads of many of his Lectures; A Treatise on Comparative Anatomy;—A Treatise on Wounds and Tumours;—and, An Oration de Cuticula. This last, as well as the short tract on comparative anatomy, has been printed in an edition of his whole works, in one volume, quarto, published by his son, Dr. Alexander Monro, at Edinburgh, in 1781. This tract had been published surreptitiously, in 1744, from notes taken at his lectures; but is here given in a more correct form.

In the year 1759, Dr. Monro resigned his anatomical chair, which he had so long occupied with the highest reputation, to his son, just mentioned; but he still continued to lecture as one of the clinical professors on the cases in the infirmary. His life was also a scene of continued activity in other affairs, as long as his health permitted. For he was not only a member, but a most assiduous attendant, of many societies and institutions for promoting literature, arts, sciences, and manufactures in Scotland; he was also a director of the bank of Scotland, a justice of the peace, a commissioner of high roads, &c. and was punctual in the discharge of all his duties. His character in private life was as amiable and exemplary as it was useful in public. To the literary honours, which he attained at home, were added those of a fellow of the Royal Society of London, and an honorary member of the Royal Academy of Surgery, at Paris.

Dr. Monro was a man of middle stature, muscular, and possessed of great strength and activity; but was subject for many years to a spitting of blood on catching the least cold, and through his life to frequent inflammatory fevers. After an attack of the influenza, in 1762, he was afflicted with symptoms of a disease of a painful and tedious nature, which continued ever after, until it terminated his existence. This was a fungous ulcer of the bladder and rectum, the distress of which he bore with great fortitude and resignation, and died with perfect calmness, on the 10th of July, 1767, at the age of seventy.

Two of his sons became distinguished physicians. Dr. Alexander, his successor, filled the anatomical chair with great credit to himself and to the university, for upwards of forty years, and became known throughout Europe by his valuable publications; especially by his Treatise on the Lymphatics, in 1770;—On the Anatomy of Fishes, 1785;—On the Nerves, 1783;—On the Bursa Mucoſæ, 1788; and three treatises on the Brain, the Eye, and the Ear, in 1797. Advancing in years, and wishing to relieve himself from the fatigues of the professorship, he associated with himself, in 1801, his son, the third Alexander Monro, who now, 1812, continues to carry on the business of that chair with considerable zeal and credit, while the respected veteran spends his age in repose.

Dr. Donald Monro, the other son of the first Alexander, settled as a physician in London, and attained considerable eminence. He became known as the author of an Essay on the Dropsy, in 1765;—On the Diseases of Military Hospitals, 1764;—On Mineral Waters, 1771;—On preserving the Health of Soldiers; and some other works, and died in the year 1802. See Life of Dr. Monro, prefixed to his works. Gen. B.og.

MONROE, in *Geography*, a county of Virginia, taken from Green Briar, on the south side; 320 miles from Washington.

MONROYO, a town of Spain, in Aragon, on the frontiers of Catalonia and Valencia; 20 miles S. of Alcaniz.

MONS VENERIS, in *Anatomy*, the elevation of the integuments over the pubes in the female subject. See GENERATION.

MONS, in *Geography*, a town of France, and principal place of a district, in the department of Jemmappe, or Gemmappe, of which it is the capital, so called from its situation on a hill. The river Trouide, which runs through it, joins the Hainne in its fauxbourg. Its castle, which was demolished in 1618, is said to have been built by Julius Cæsar, and Quintus Cicero, brother to the celebrated orator, was besieged in this place, and relieved by Cæsar, 50 years B.C. The town is large, the streets are broad, and the great market-place, which is very spacious, contains the town-house, which is a fine old building, with a steeple erected by the states in 1716, the palace of the government, and that of the council of the province. These three palaces are adorned with sculpture and painting. The great church is a fine building, the side altar and chapel being wholly constructed of fine marble: here is a marble tomb, finely embellished; and the statues, among which are the four cardinal virtues, and the resurrection, are in high estimation. Mons is a place of good trade for various articles, particularly woollen stuffs, which are manufactured here in large quantities. The magistracy is composed of a chief, ten scheidins, two pensioners, three greffiers, &c. This town has frequently suffered by the calamities of war. In 1746 its fortifications were demolished by the French; and in this state it was restored to the emperor by the peace of Aix-la-Chapelle. After the battle of Jemmappe, it was summoned by Dumourier, and surrendered the next morning. It contains 18,291 inhabitants, in 2 cantons; the north canton including 13,381, on a territory of 37½ kilometres, in 5 communes; and the south containing 14,252, on a territory of 45 kilometres, in 8 communes. N. lat. 50° 27' 10". E. long. 3 37' 15".

MONSEFU, a town of Peru, in the bishopric of Truxillo; 12 miles S. of Lambayeque.

MONSEIGNEUR, compounded of *mon*, *my*, and *ſeigneur*, *lord*, in the plural messeigneurs, a title of honour and respect used by the French in writing to persons of superior rank or quality.

Dukes, peers, archbishops, bishops, and presidents *a la mortier*, are complimented with the title of messeigneur.

In the petitions presented to the sovereign courts, they use the term messeigneurs.

MONSEIGNEUR, absolutely used, was a title formerly restrained to the dauphin of France.

This custom was unknown till the times of Louis XIV., till then the dauphin was styled *monſieur le dauphin*.

MONSIEUR, a compound of *mon*, *my*, and *ſieur*, *ſir*, in the plural messieurs, a term or title of civility, used by the French, in speaking to their equals, or those a little below them; answering to Mr. or Sir, among the English.

The superscription of all letters begin *A monsieur*, *monsieur* such a one.

The use of the word monsieur was formerly more extensive than at present: they applied it to people who lived many ages before them. Thus monsieur St. Augustine, monsieur St. Ambrose; and the vulgar still say, monsieur St. Paul, monsieur St. Jaques, &c. The Romans, during the flourishing time of their liberty, were unacquainted with that term of parade and flattery, which they afterwards made use of in the word *dominus*. In speaking or writing to each other, they only gave each other their proper names; which practice lasted even after Cæsar had brought the republic under his command: but after the Roman emperors were once well seated on the throne, the courtiers and minions, who by flattery sought to procure favours from them, studied new honours. Suetonius observes, that a comedian on the theatre having called Augustus *dominus*, *lord*; the spectators all stared at him; so that the emperor forbade, for the future, the title to be attributed to him. Caligula was the first who expressly commanded himself to be called *dominus*. Martial, entirely devoted to tyranny, calls Domitian *dominum deumque nostrum*. In time, the title was also applied to the people; and of *dominus*, at length was formed *dom*.

MONSIEUR, absolutely used, is a title or quality formerly appropriated to the second son of France, or the king's brother.

In a letter of Philip De Valois, that prince, speaking of his predecessor, calls him *monsieur le roy*, monsieur the king.

MONSIGNI, M. DE, in *Biography*, formerly maitre d'hotel to the duke of Orleans, father of l'Egalité, was one of the creators of the French comic opera, for which, between the years 1759 and 1777, he composed eleven or twelve different dramas, which, we believe, were all successful; particularly "Le Cadé Dupé; on ne s'avise jamais de tout;" "Le Roi et le Fermier;" "Rose et Colas, &c."

This kind of drama was established at the theatre de la Foire, in 1754, upon the idea of the Italian burletta, in all things except the recitative, the dialogue in the French opera comique being spoken, and incidentally mixed with airs. This ingenious and pleasing composer's name of Monsigni seems Italian; but his style of melody is neither Italian nor French, but a mixture of both. Nothing could be more pleasing and amusing than these dramas to the natives of all Europe, not great critics in singing; for it must be owned, that they were all well written, well set, and well acted; and in the principal man's part, when performed by the admirable Caillot, well sung. Duni, Philidor, and Monsigni, were the patriarchs of the comic musical dramas, and Gretry the king David.

MONSOL,

MONSOL, in *Geography*, a town of Africa, in the kingdom of Anziko, and residence of the micocco or king. S. lat. 1°. E. long. 3° 50'.

MONSON, Sir WILLIAM, in *Biography*, a naval commander, and a writer upon naval subjects, was born about the year 1569, and was sent, at an early age, to Balliol college, Oxford, where he remained about two years. Being desirous of engaging in the sea-service, to which, probably, his parents objected, he entered, without their knowledge, on board a small vessel, fitted out to cruise against the Spaniards. After some years' active service, he accompanied the earl of Cumberland in two expeditions, in the second of which he was taken by the Spaniards, and was detained a prisoner two years. As soon as he was liberated, in 1593, he attached himself again to the earl's service, in which he made two more voyages. In 1596, he was captain of a ship in the earl of Essex's expedition to Cadiz, and in the next year in that to the Azores. After the accession of king James, he was appointed, in 1604, admiral of the narrow seas, an office which he sustained twelve years with credit to his own well earned reputation, and honour to the British flag, by protecting the trade and fisheries from all encroachments. His zeal against the pretensions of the Dutch, and his endeavours to promote an enquiry into the state of the navy, against the will of the earl of Nottingham, lord high admiral, involved him in troubles, and occasioned his committal to the Tower, in 1616; but upon examination into his conduct he was discharged. He was consulted on the duke of Buckingham's expedition against Algiers, Cadiz, and the isle of Rhé, all which he disapproved, and his opinion was fully justified by their want of success. To his country his opposition was unavailing, and to him it was unfortunate, having been kept out of employ for several years; but in 1635 he was appointed vice-admiral. After this he withdrew to a life of privacy, and employed himself in finishing his "Naval Tracts." He died in February, 1642-3, leaving a high reputation as a brave, prudent, and upright commander. He had not the good fortune to perform any very splendid services, yet his zeal for the improvement of the navy of his country merits an honourable mention. His Naval Tracts contain plans and projects for the advancement of the interests of trade and navigation. They are inserted in the third volume of Churchill's Collection of Voyages. Biog. Brit. Campbell's Lives of the Admirals, Stockdale's edition.

MONSON, in *Geography*, a township of Hampshire county, Massachusetts, E. of Brimfield.

MONSONIA, in *Botany*, is designed to commemorate the late lady Ann Monson, a lady of distinguished talents, as well as of eminent botanical taste and knowledge, who by a long residence in the East Indies, had great opportunities of cultivating the study of plants, as well as insects. We trust we shall betray no inviolable secret, in recording that it was to this excellent lady the late Mr. Lee alluded, in the preface to his Introduction to Botany, first published in 1760, where he says he was enjoined not to acknowledge his obligations to those who had kindly helped him in his undertaking. A most elegant East Indian *Illecebrum* was first chosen by Koenig, if we mistake not, to bear the name of *Monsonia*, which remains as its specific appellation; and a more distinct genus, of greater splendour, has been selected for the purpose. Some have thought this but too near to *Geranium*.—Linn. Mant. 14. Schreb. 459. Willd. Sp. Pl. v. 3. 717. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 100. Juss. 269. Lamarek Illustr. t. 638. Cavan. Dill. 179. —Class and order, *Polyadelphia Dodcandria*. Nat. Ord. *Gruinales*, Linn. *Gerania*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five lanceolate, awned, equal, permanent leaves. *Cor.* Petals five, obovate, abruptly toothed, and jagged, longer than the calyx, inserted into the short annular receptacle, or nectary. *Stam.* Filaments fifteen, united into five sets, three in each set, all inserted into the nectary; anthers oblong. *Pist.* Germen superior, pentagonal, short; style awl-shaped; stigmas five, oblong, spreading. *Peric.* Capsules five, aggregate, cartilaginous, oblong, lateral, separating at their inside, each attached upwards to a very long, spiral, elastic awn. *Seeds* solitary, lateral, oblong, somewhat cylindrical.

Ess. Ch. Calyx of five leaves. Petals five, abrupt, toothed. Stamens in five sets, united by a common base. Style five-cleft. Fruit beaked, of five aggregate capsules, with long spiral awns.

1. *M. speciosa*. Large-flowered Monsonia. Linn. Mant. 105. Curt. Mag. t. 73. Cavan. Diss. 179. t. 74. f. 1.—Leaves quinate; leaflets bipinnatifid.—Native of the Cape of Good Hope, like the whole genus. It was sent to Kew in 1774, by Mr. Masson, and decorates the green-house magnificently in spring. *Root* perennial. *Stems* sometimes very short. *Leaves* numerous, mostly radical, on long stalks, and composed of five radiating hairy leaflets, doubly pinnatifid; their segments linear-lanceolate, bluntish, decurrent. *Flowers* two or three inches broad, with deeply cut petals, variegated with shades of rose-colour, ribbed, the eye purple and white; each on a long, bent, simple stalk, with a whorl of lanceolate bractees at its joint. *Calyx-leaves* membranous at the edge, downy upward. Beak of the fruit three inches long, its awns hairy at the inside.

2. *M. lobata*. Broad-leaved Monsonia. Dryand. in Ait. Hort. Kew. ed. 1. v. 3. 100. Willd. n. 3. (*M. filia*; Linn. Suppl. 341. Cavan. Diss. 180. t. 74. f. 2. Andr. Repof. t. 276.)—Leaves heart-shaped, deeply lobed, toothed.—Differs from the last in having the leaves lobed, not compound, though they are sometimes so deeply cut as almost to approach the former. In the flowers there is scarcely a permanent distinction. The petals of the present species are usually greenish at the back, white, with a tinge of red, above. It is much to be suspected that these are but varieties of each other.

3. *M. ovata*. Undulated Monsonia. Willd. n. 4. Cavan. Diss. 193. t. 113. f. 1. (*M. emarginata*; L'Herit. Geran. t. 41. *Geranium emarginatum*; Linn. Suppl. 306.)—Leaves ovate-oblong, toothed, plaited; somewhat heart-shaped at the base.—Sent from the Cape to Kew garden, in 1774, by Mr. Masson, with both the former. This is more caulescent than those, but more slender, and only a biennial. The leaves are nearly ovate, about an inch long. Flowers pale yellow, about an inch in diameter. Beak of the fruit two inches in length. The branches, flower-stalks, and calyx are clothed with very long spreading hairs.

4. *M. spinosa*. Thorny Monsonia. Willd. n. 5. L'Herit. Geran. t. 42.—Leaves elliptical, pointed, entire. Foot-stalks permanent, hardening into thorns.—Stem shrubby, branched, beset with thorns, which are the hardened foot-stalks of former leaves. Flowers larger than in the last.

M. tenuifolia, Willdenow's first species, is our *Grielum tenuifolium*. See GRIELUM.

MONSONIA, in *Gardening*, contains plants of the herbaceous under-shrubby biennial and perennial kinds, for the green-house, of which the species cultivated are, the fine-leaved monsonia (*M. speciosa*); the broad-leaved monsonia (*M. lobata*); the undulated monsonia (*M. ovata*.)

Method of Culture.—The first sort, as it rarely if ever ripens seeds in this climate, must be increased by cuttings of

the root, which should be planted in pots of good mould, and plunged in a tan hot-bed, watering them occasionally, when in a little time buds appear on the tops of the cuttings which are left out of the ground. They should be treated as hardy green-house plants, or be afterwards removed into separate pots, and sheltered under a good garden-frame in the winter season. And the second sort may be best raised in the same manner.

But the third sort should be raised from seeds, which must be sown in the early spring, in pots of light earth, and plunged in a mild hot-bed. When the plants are come up, they should be removed into other pots separately and be managed as the other kinds.

These afford variety among other potted plants.

MONSOON, a regular or periodical wind in the East Indies, blowing constantly the same way, during six months of the year, and the contrary way the remaining six.

In the Indian ocean, the winds are partly *general*, and blow all the year round the same way, as in the Ethiopic ocean; and partly *periodical*, *i. e.* half the year blow one way, and the other half year on the opposite points: and those points and times of shifting differ in different

parts of this ocean. These latter are what we call monsoons.

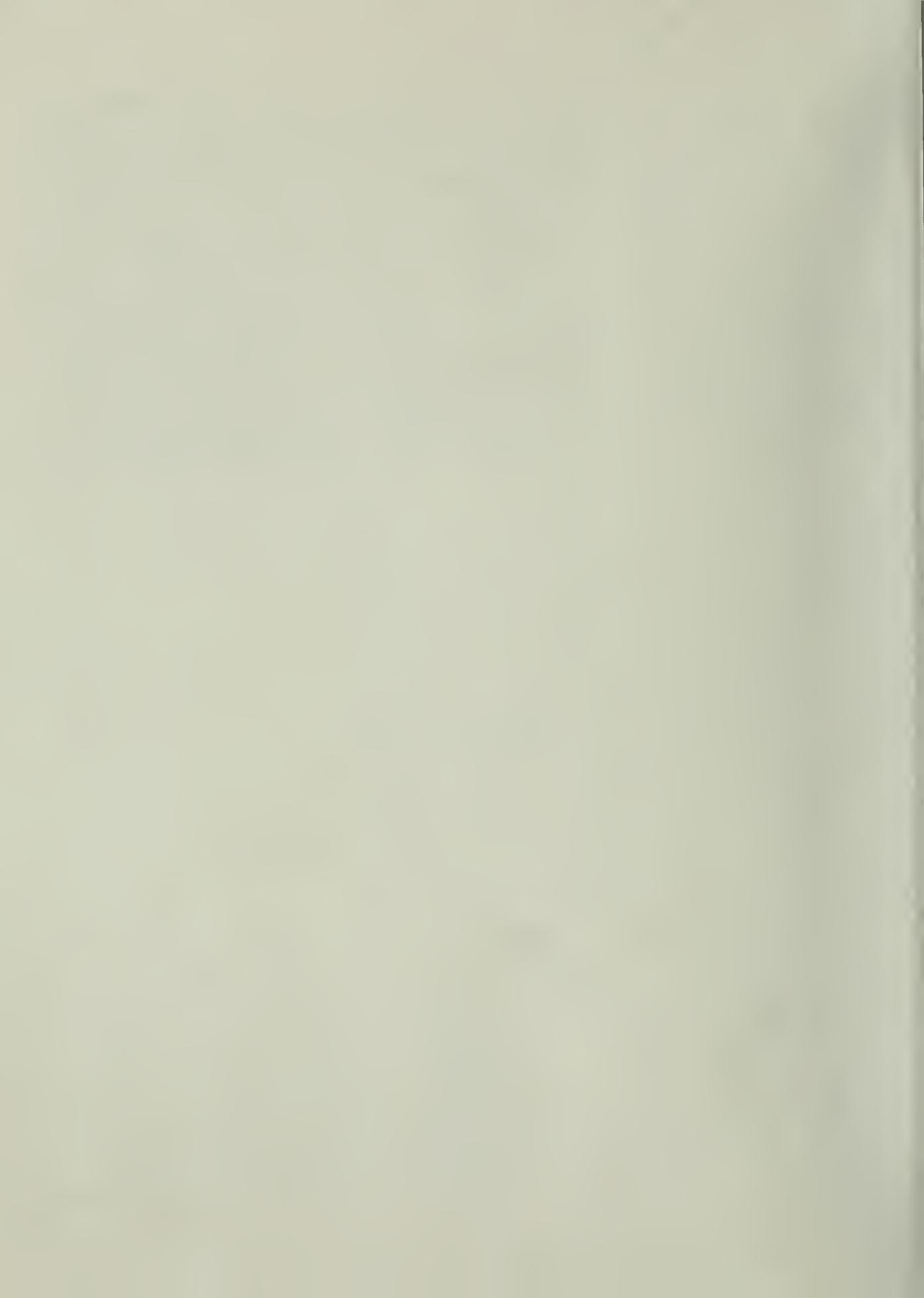
The shifting of these monsoons is not all at once: and in some places the time of the change is attended with calms, in others with variable winds, and particularly those of China, at ceasing to be westerly, are very subject to be tempestuous: and such is their violence, that they seem to be of the nature of the West India hurricanes, and render the navigation of those seas very unsafe at that time of the year. These tempests the seamen call the *breaking up of the monsoons*.

Monsoons, then, are a species of what we otherwise call *trade-winds*.

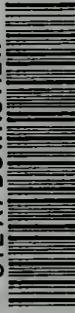
They take the denomination monsoon from an ancient pilot, who first crossed the Indian sea by means of it. Though others derive the name from a Portuguese word signifying *motion*, or change of wind, and sea.

Lucretius and Apollonius make mention of annual winds which arise every year, *etesa flabria*, which seem to be the same with what in the East Indies we now call monsoons. For the physical cause of these winds, see METEOROLOGY and WIND.

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